National Urban Mobility Plans

Outline for NUMP Proposal for Tanzania

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Title

National Urban Mobility Policy proposal for Tanzania

About this report

This document is a dynamic work-in-progress developed as part of the SOLUTIONSplus project, aimed at assisting the Tanzanian government in facilitating the adoption of electric mobility. It provides a comprehensive framework for policy development and collaboration. Currently, the policy advisory paper is being refined in consultation with the Tanzanian government and relevant stakeholders to ensure it meets the nation's specific needs and objectives.

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List of Abbreviations

AFEMA	Africa Electric Mobility Alliance
BRT	Bus Rapid Transit
CAP	Climate Action Plan
CC	Cubic Capacity
CKD	Completely Knocked-Down Kits
CNG	Compressed Natural Gas
CoC	Certificate of Conformity
CPF	Custom Processing Fee
COSTECH	Tanzania Commission for Science and Technology
DART	Dar Rapid Transit Agency
DIT	Dar es Salaam Institute of Technology
EAC	East African Community
EV	Electric Vehicle
FABIO	First African Bicycle Information Organization
FASTA	Name of local cooperative operating pedal-assist electric bicycles
GIS	Geographic Information Systems
GHG	Greenhouse Gas
ITS	Intelligent Transport Systems
KPI	Key Performance Indicator
LATRA	Land Transport Regulatory Authority
LEZ	Low Emission Zones
M&E	Monitoring and Evaluation
MOF&P	Ministry of Finance and Planning
MRV	Monitoring, Reporting, and Verification
NCMC	National Carbon Monitoring Centre
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
NMT	Non-Motorized Transport
NTR	National Transport Policy
NUMP	National Urban Mobility Plan
PEM	Production Engineering of E-Mobility Components
R&D	Research and Development
RDL	Railways Development Levy
SDG	Sustainable Development Goal

SESCOM	Sustainable Energy Services Company
SKD	Semi-Knocked-Down Kits
SOLUTIONSplus	Name of the project under which the NUMP is developed
SUMPs	Sustainable Urban Mobility Plans
TACTIC	Tanzania Cities Transforming Infrastructure and Competitiveness project
TANROADS	Tanzania National Roads Agency
TARURA	Tanzania Rural and Urban Roads Agency
TBS	Tanzania Bureau of Standards
TRA	Tanzania Revenue Authority
TRI	Name of a local company/brand providing electric three-wheelers
TOD	Transit-Oriented Development
UN-Habitat	United Nations Human Settlements Programme
UNFCCC	United Nations Framework Convention on Climate Change
UEMI	Urban Electric Mobility Initiative
VAT	Value Added Tax

01

Introduction

Urban mobility plays a key role in delivering on national objectives under the Paris Agreement, the Sustainable Development Goals, and the New Urban Agenda. National governments play a crucial role in shaping urban mobility policy, planning, and investment through, for example, the regulation and taxation of vehicles and fuel use, the transfer of power to local authorities, and in particular through the management and appropriation of national land transport funds.

The complexity of urban mobility systems requires a strong policy framework on the national level that supports integrated urban design, enables the shift to low-carbon mobility, and fosters the take-up of innovative vehicle technologies and mobility services.

This report aims to map out key components in the national policy framework that affect the transition to a sustainable mobility system based on the learnings from the local demonstration in the urban living labs. It aims to advise decision-makers on the national level (e.g. from the Ministry of Works and Transport and the Ministry of Urban Development) in defining and implementing National Urban Mobility Plans (NUMPs).

The co-development processes in the SOLUTIONSplus living labs will highlight policy, regulatory, fiscal, and operational issues that could inform NUMP documents at all relevant levels, including:

a) **National Urban Mobility Plan (NUMP)**, as a strategic framework to structure sustainable urban mobility and coordinating mechanisms within government, and
b) **National Urban Mobility Policies**, as concrete measures for sustainable urban mobility, and
c) **National Urban Mobility Investment Programs**, to deliver on the objectives and priorities outlined in the NUMP and specify investments from the national level to assist cities in delivering on their individual Sustainable Urban Mobility Plans (SUMPs).

The recommendations presented in this report will be co-developed with local and national policymakers, and public and private sector actors involved in the policy dialogue and local implementation in the respective country.

1.1 Structure

In the SOLUTIONSplus NUMP proposals, learnings from the urban demonstrations will be summarized and used to reflect on the regulatory, fiscal, and planning-policy issues that should be considered in a NUMP process. While the SOLUTIONSplus living lab focuses on innovations for urban electric mobility, these innovations need to be embedded within a broader framework at municipal, city, state (where applicable), and national levels. This approach ensures that synergies between policy objectives are maximized and creates a favorable operating environment for the rapid adoption of sustainable mobility solutions that are tailored to the specific needs of each area.

1.2 Summary of the learnings from the SOLUTIONSplus Urban Living Labs

Focus on e-mobility

Inform

SOLUTIONSplus partners collectively identified a dearth of data on current ICE bajajis, which was significantly hindering the identification of suitable charging and vehicle technologies, hence hindering a sound transition to electric bajajis.

Consequently, the SOLUTIONSplus team **engaged in extensive data collection efforts** throughout 2021 and 2022 to assess the feasibility of electrification of e-bajajis in Dar es Salaam. This included GPS tracking, surveys of drivers and users, and a meticulous analysis of operational and business strategies.

The resulting **wealth of data-informed appropriate technical specifications for vehicles, charging infrastructure, and operational strategies**, focusing on the needs and preferences of drivers. This includes, for instance:

- Integrating the views and preferences of bajaji drivers on 3 key aspects (sufficient range, vehicle robustness, and availability of spare parts) is essential to ensure a just and efficient transition.
- The average daily mileage with ICE bajajis in the areas studied is found to be 120 km going up to 136 km. To avoid immobilisation as much as possible during the day, most of the charging should take place overnight, with a battery capacity of circa 7 to 8 kWh. Charging during the day should serve as a limited top-up, not necessarily requiring a full charge.
- Pilots can start with drivers parking at home, having a safe and earthed grid connection. Going forward, for the other half drivers found to park at a third party guarded space (e.g. political party's office or a supermarket), another system involved the third party needs to be designed.

FIGURE 1
Data collection via GPS, survey, and interviews with electric three-wheeler drivers

- Shifting to e-bajajis reduces the drivers' operational costs by removing the high fuel costs, which currently represent nearly half of their daily costs.
- The general interest of the drivers in an e-bajaji pilot (82% of them) is a positive factor. Selecting waiting points where drivers showed clear interest in the pilot is important for local ownership of the project and continuous dialogue.

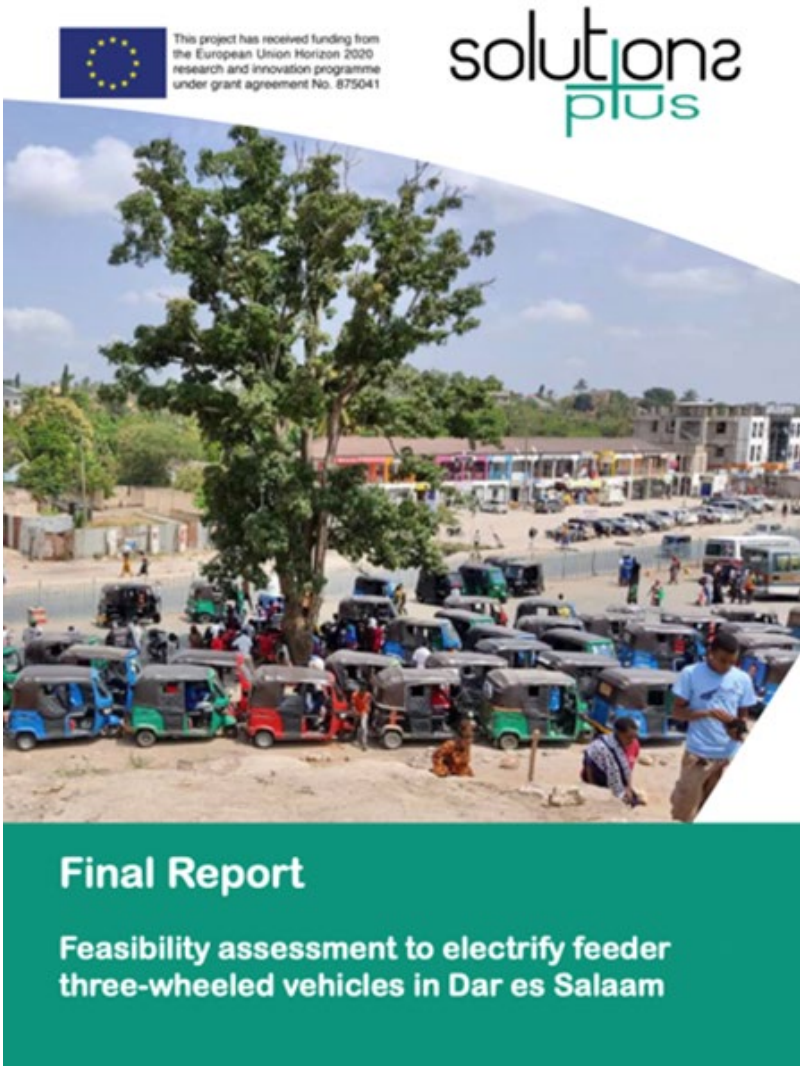
This collaborative and inclusive approach was recognised as a positive case study in the C40 global publication 'City guide for two and three-wheeler management and electrification'.

Informing partners of SOLUTIONSplus Dar es Salaam on modalities and characteristics of electric mobility was done through capacity-building (see next row) and k**nowledge products available on the SOLUTIONSplus online toolbox**. In particular, several guides on the electrification of three-wheeled vehicles in Asia and electric bicycles were incorporated into and used by partners of the Dar es Salam Living Lab, since those two vehicle types are the core of the Dar es Salaam demonstration action.

Lastly, informing all about the results of the pilots was done through a **thorough impact assessment** throughout the project duration, assessing baseline, ex-ante, ex-post and scale-up scenarios.

FIGURE 2

Feasibility Assessment



Inspire

On top of the online e-courses on e-mobility available for all SOLUTIONSplus partners worldwide, stakeholders in Dar es Salaam benefited from several **regional and city training sessions** focusing on training topics identified as priority areas in 2020. Week-long training sessions addressed EV Charging Infrastructure for all modes (2021), EV battery technologies and their end-of-life management (2022), and public transport electrification (2023).

A **high-level E-Mobility Forum** was organised in 2023, gathering key Tanzanian and sub-Saharan stakeholders, providing an area for exchanges on e-mobility in Tanzania and Africa, and organising an EV Exhibition Fair. This was the first event on e-mobility in Dar es Salaam, raising large interest from decision-makers and the private sector.

Additionally, **peer-to-peer exchanges** were facilitated with stakeholders from the SOLUTIONSplus city network on electric three-wheelers. An exchange with Indian cities, which are more advanced in these vehicles, took place in July 2022. Partners from DART exchanged with Hamburg transport stakeholders on bus electrification and electric micro mobility, as well as other demonstration actions partners across the globe, during the study visit in Hamburg in September 2022.

FIGURE 3

Regional training on EV Battery technologies and End-of-life Management

FIGURE 4

Africa E-mobility Forum

Initiate

Five local start-ups received financial and technical support in Dar es Salaam: four working on electric three-wheelers (Auto Truck/DIT, SESCOM, TRI, Ekoglobe) and one local cooperative operating pedal-assist electric bicycles (FASTA).

The **seed funding for the e-bajaji project component** followed a two-phase approach. Between 2020 and 2023, a Phase I focused on promoting local Research & Development, in the form of either ICE bajajis retrofitted to electric bajajis or prototypes, of fully new electric bajajis. Vehicles were locally designed, manufactured, and assembled, using locally sourced materials or components as much as possible (DIT/ Auto Truck and SESCOM, total of 6 vehicles). Between 2023 and 2024, a Phase II looked to expand the e-fleet with a total of 37 vehicles, locally designed and locally assembled, which represents advancement compared to the mainstream previous practice of importing fully or semi-assembled vehicles (Ziotio Company-brand TRI and Ekoglobe). More information on the two phases is given in section "Implement".

Alongside seed funding, SOLUTIONSplus provided **technical advice support** through consortium members or external EU organisations selected through EU matchmaking calls. In Dar es Salaam, start-ups received technical support on battery sizing and on the retrofitting process through the SOLUTIONSplus partner IDIADA and the Germany-based PEM Motion selected through an EU matchmaking call. In June 2024, a technical training programme on electric mobility for local technicians was organised by SOLUTIONSplus with DIT, EURIST and FABIO in Dar es Salaam.

FIGURE 5

Auto Truck electric three-wheelers manufactured at DIT

DIT staff and students were trained at DIT to a assemble, repair, maintain and safely use pedal-assist electric bicycles. Through this process, EURIST transformed into a new company known as AfricroozE GmbH with an important market potential, now with 300 electric bicycles present in 8 African countries.

FIGURE 6

Assembly of Africrooze electric bicycles at DIT

Implement

In the pursuit of sustainable and innovative transportation solutions, the SOLUTIONSplus Dar es Salaam concentrated on **two key areas: transition towards electric three-wheelers in place of current ICE ones, and introduction of pedal-assist electric bicycles** as a fully new mobility option in Dar es Salaam. The endeavour involved a multifaceted approach, encompassing the development of prototypes, local partnerships, and extensive data collection.

One key aspect of this initiative is the **introduction of electric three-wheelers** designed for passenger feeder services to the Bus Rapid Transit (BRT) system. In total, SOLUTIONSplus enabled the roll-out of a total of 43 electric three-wheelers in Dar es Salaam (39 new vehicles and 4 retrofitted vehicles), deployed by five different companies. These electric three-wheelers are either retrofitted (converted) fossil-fuel bajajis into electric bajajis, or fully new electric three-wheelers. Thus, a wide range of vehicle designs and technologies were tested. The project carefully studied the patterns of ICE bajajis to identify appropriate technical specifications, in particular, the battery capacity and the charging strategy (SOLUTIONSplus Feasibility assessment to electrify feeder three-wheeled vehicles in Dar es Salaam, 2023). Lastly, all electric three-wheelers all use lithium-ion batteries, comparatively more performing than lead-acid batteries and more adapted to the needs of the drivers of bajajis, and representing a shift away from other electric three-wheelers found using polluting and less efficient lead-acid batteries.

FIGURE 7

Auto Truck/DIT Company Ltd

FIGURE 8

SESCOM

During **Phase I focusing on promoting local Research & Development**, two companies were financially supported by UN-Habitat. Auto Truck assembled two new electric bajajis and retrofitted one ICE bajaji at the Dar Institute of Technology (DIT). The collaboration with the DIT has provided strong local anchorage, enabling the assembly of vehicles and the training of engineering students. The vehicles are charged at DIT. The vehicles have been tested and are currently pending certification from TBS and registration with TRA which will allow for subsequent commercialisation. Designs for the fleet application management system were developed in collaboration with the Kenyan branch of the hardware supplier Teltonika, a company based in Lithuania. Another company, Sustainable Energy Services Company (SESCOM) retrofitted three ICE bajajis. After finalising a retrofitting manual and proceeding to the technical operational testing, the vehicles were tested and are pending certification by TBS. They will then be registered with TRA and LATRA authorities and deployed along the Tangi Bovu – Goba route. This route connects to the Mbezi Mwisho BRT terminal, and connecting to other minibus bus stops, such as the Ulomi bus stop.

During **Phase II focusing on expanding the locally assembled e-fleet** (2023-2024), Ziotio Company (brand TRI) and Ekoglobe were selected to provide additional vehicle design and charging approaches, with seed funding provided by UEMI. Via SOLUTIONSplus, TRI deployed 20 electric bajajis using plug-in charging overnight and topped up during the day, and 5 further vehicles of the iterated bajaji model E2 in 2024.

Ekoglobe assembled 12 electric three-wheelers for passenger services and trained 12 drivers. The vehicles are operated at a bajaji waiting point close to a BRT station, where drivers use them to provide passenger feeder services to a university and residential area. The technical specifications and the route selected for the pilot are based on the 2023 SOLUTIONSplus feasibility study to electrify existing three-wheelers near BRT stations.

FIGURE 9

Phase II - Expanding the e-three-wheeler(bajaj) fleet: new electric-three-wheelers by TRI

Ekoglobe

FIGURE 10

In addition to the electric three-wheeler project, SOLUTIONSplus introduced 16 **pedal-assist electric bicycles designed for urban deliveries** and the transportation of medical supplies. These vehicles were not present in Dar es Salaam prior to the project.

In 2022, the SOLUTIONSplus team collectively mapped needs and stakeholders, which led to identifying urban deliveries as the most promising use case for the electric bicycles. Partners identified potential receivers and established partnerships with the FASTA Cycling Cooperative and the Dar es Salaam Institute of Technology (DIT). Co-designed by EURIST and the German company HNF Nicolai, these 16 electric bicycles and 5 additional batteries were shipped in October 2022. A three-day workshop held at the Dar Institute of Technology in November 2022 enabled to train DIT staff, students and FASTA cyclists on the use and the assembly of the electric bicycles. Participants assembled the electric bicycles before the official inauguration ceremony at the Aga Khan Hospital.

Currently, the e-bikes are actively employed for transporting medical supplies on behalf of the Aga Khan Health Services, showcasing significant scale-up potential. Realising that electric bicycles do not receive as much attention as other vehicles in Africa such as electric motorcycles, this pilot prompted SOLUTIONSplus partners to develop an Africa E-Bicycle Start-up Booklet disseminated by UNEP and receiving significant interest among African partners. In addition, the pilot has laid the foundation for a prefeasibility study in 2024 to further scale up the use of e-bicycles for urban deliveries in Dar es Salaam and the broader East African region.

FIGURE 11

Current charging station at DIT

Location of the chargers deployed by TRI for DART, at or near BRT stations

FIGURE 12

FIGURE 13
UN-Habitat communication video

FIGURE 14
Electric bicycles: official launch in front of the Aga Khan Hospital

FIGURE 15
One FASTA cyclist riding an electric bicycle

Impact

SOLUTIONSplus took a leading role in several areas: feasibility assessment, policy analysis, visibility of e-mobility, and preparation of follow-up projects.

First, SOLUTIONSPlus paved the way by **assessing the regulatory, fiscal, and market environment** for the introduction of electric three-wheelers. Looking at the wider policy environment, SOLUTIONSplus identified barriers to the uptake of electric mobility jointly with the Africa E-Mobility Alliance. Leaning on this analysis, SOLUTIONSplus issued key recommendations for national and local policies. At national level, SOLUTIONSplus issued a policy paper on electric mobility policies in Tanzania, as well as a National Urban Mobility Policies and Investment Program. At local level, SOLUTIONSplus developed a City Roadmap identified pathways for sustainable and electric urban mobility in Dar es Salaam.

Visibility on electric mobility was significantly increased through the high-level E-Mobility Forum, first event on e-mobility in Dar es Salaam, and EV Exhibition Fair.

Lastly, SOLUTIONSplus partners engaged **preparations for two key follow-up projects**, sharing suggestions for a follow-up project with the EU Delegation and through the already approved EU R&D eBRT2030 project.

FIGURE 16

Joint SOLUTIONSplus-AFEMA publication

FIGURE 17

EV Exhibition Fair

Participants to the E-Mobility Forum

FIGURE 18

1.3 Context: Integrating electric mobility within a wider urban mobility transition

To adopt innovative electric-mobility solutions, it is crucial to understand the needs and opportunities of key players in the sector, including industry, mobility service providers, infrastructure developers, local and national policymakers, and transport users. Essential building blocks for the transition to sustainable mobility include a complementary package of measures from both local and national levels, providing a framework for transformative change. These measures include planning, infrastructure, fiscal policies, regulatory frameworks, and information dissemination.

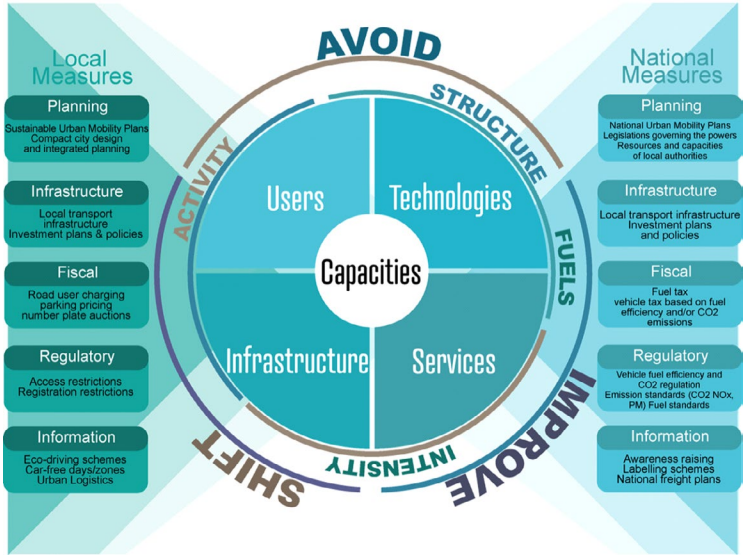
A transition to a systemic approach can unlock trillions of dollars in cost savings from a whole-society perspective. By 2050, a low-carbon mobility system could cut transport-related annual costs by over US$5 trillion globally. More sustainable travel patterns can generate substantial complementary benefits that could help transform cities into more liveable and sustainable centers.

Policy interventions to foster the sector's electrification can help achieve a range of objectives—for example, air quality improvements and reductions of GHG emissions. However, addressing all key objectives—such as access to safe roads and liveable cities—requires a much broader package of measures. Linking and packaging policies are also a key tool to generate synergies between different measures and to align different players.

Electric mobility needs to be embedded within an overarching approach that consists of several levels of intervention that shape not just vehicle technology but also mobility patterns and urban form. So, how can such an approach be adopted in practice? An integrated approach includes:

- **Technologies:** In terms of EV technologies, there should be a clear focus on drastically downsizing vehicle size and power, fostering resource- and energy efficiency, and boosting cost-effectiveness. This is countering the trend of the last few decades towards bigger, faster, and more powerful cars, which has eradicated almost all efficiency gains in powertrain technologies. Only then will the electrification of the entire vehicle fleet be viable and affordable. In addition, EV concepts should be designed for shared use cases, further fostering access and affordability. Other technological innovations, such as automation, should focus on complementarity with public transport systems and avoid competition with non-motorized transport. This is vital to the viability of public transport services and encourages healthy and active mobility. Automation could play an essential role in providing on-demand mobility services in rural areas where traditional public transport options are not viable.
- **Infrastructure:** Providing access for all to high-quality public transport services, as well as infrastructure for walking and cycling, is a vital part of a systemic approach to sustainable mobility. To enable this, compact city development can help with mixed-use, polycentric structures, and short travel distances. A comprehensive network of charging solutions and reliable availability of charging points is crucial for a systemic change to drive a shift to EVs.

FIGURE 19 **Systemic approach for sustainable mobility**



- **Services:** Access to mobility services such as shared and ride-hailing services is another important element for sustainable mobility. Services should be harmonized across available mobility services to encourage using the most efficient option.
- **Users:** Transport system users should have access to transparent information about the cost, time, safety, and other relevant aspects of different available mobility solutions and vehicles. Differentiated pricing should favor more efficient modes and vehicles to guide consumer choices. Regulation of vehicle standards and technologies could further ensure that consumers have sufficient access to safe and efficient vehicles.

There is a general assumption that the transformation towards sustainability in the transport sector will be very costly. While shifting towards more sustainable mobility infrastructure, services, and vehicle technologies will require innovation and investment, the overall benefits and savings far outweigh the costs. A sustainable mobility future will require only a fraction of the costs and resources needed today. Achieving this, however, will require a systemic change and shift from an individual perspective towards mobility as a product, to a societal perspective towards mobility as a service. The analysis presented in this report will reflect on these aspects and provide targeted recommendations for each national policy environment.

1.4 Tanzania's Comprehensive Approach to Sustainable Transport and Climate Action:

1.4.1 Tanzania's Nationally Determined Contributions (NDCs)

The Paris Agreement, adopted in 2015 under the United Nations Framework Convention on Climate Change (UNFCCC), aims to limit global warming to well below 2 degrees Celsius and pursue efforts to limit it to 1.5 degrees Celsius above pre-industrial levels. This international treaty requires participating countries to set and periodically update their Nationally Determined Contributions (NDCs) to mitigate greenhouse gas emissions and strengthen resilience to climate change impacts. Tanzania's Nationally Determined Contributions (NDC) for 2021 outline its commitment to reduce greenhouse gas emissions by 30-35% relative to the Business-As-Usual (BAU) scenario by 2030. This reduction target translates to an expected decrease of approximately 138-153 million tons of carbon dioxide equivalent (MtCO2e) in gross emissions. Tanzania's NDC aligns with its broader sustainable development agenda, emphasizing the country's commitment to combating climate change while pursuing economic growth and development. To ensure proper commitment to the NDCs Tanzania set up the National Carbon Monitoring Centre (NCMC) which plays an important role in ensuring it achieves its commitments. The authority is also crucial in supporting policies to reduce greenhouse gas emissions. To reduce CO_2 emissions in its transport sector, Tanzania is focusing on enhancing its rail and road networks to promote the use of public transportation. Improved connectivity and infrastructure development are crucial in decreasing reliance on individual motorized vehicles, thereby contributing to lower emissions. Significant initiatives include the improvement of rapid transit systems and the construction of the Standard Gauge Railway (SGR), which utilizes electric trains. These efforts are central to Tanzania's strategy to mitigate emissions by offering more efficient and low-carbon alternatives to traditional transportation modes. Apart from its Nationally Determined Contributions (NDCs), Tanzania benefits from a comprehensive framework of regional, national, municipal, and city-level policies that support low-carbon transport initiatives.

1.4.2 Regional Policies Supporting Low-Carbon Transportation

At the regional level, Tanzania has embraced a multi-level policy framework to support low-carbon transportation solutions. As part of the East African Community (EAC), Tanzania benefits from regional policies aimed at establishing emission standards

and improving infrastructure for non-motorized vehicles. The EAC sets permissible emissions limits for common pollutants found in motor vehicle exhaust, including carbon monoxide, particulate matter, nitrogen oxides, and hydrocarbons. These limits apply to all vehicles, including cars, commercial vehicles, and motorcycles, and cover new, imported used, and in-use vehicles. The EAC Gazette also sets air quality standards (EAS 1047:2022). Additionally, the EAC Climate Change Policy requires member countries to develop air pollution emission standards, particularly for the industry and transport sectors, focusing on increasing the quantity and efficiency of public transport systems and improving accessibility for all users, especially for gender inclusivity. The EAC Climate Change Master Plan (2011-2031) promotes transportation infrastructure for non-motorized transport to enhance safety. The Master Plan suggests investment in low-carbon and low-cost public transport, including Bus Rapid Transit (BRT), and recommends increased investment in rail systems, stricter emissions standards on motor vehicles, and more effective transportation and urban planning to enhance efficiency and reduce reliance on motorized transport.

1.4.3 National Policies Driving Sustainable Transport Initiatives

At the national level, the National Climate Change Response Strategy (NCCRS) guides Tanzania's climate change initiatives from 2021-2026. It outlines key objectives, strategies to achieve them, targets, indicators, estimated budget, timeframes, means of tracking, and responsible institutions. Regarding energy, the strategy promotes the development of less carbon-intensive energy infrastructures, climate-resilient infrastructure for human settlements and industry, smart cities and eco-smart villages, and the development of low-carbon technologies such as renewable energy microgrids to facilitate economic development. In transportation, the NCCRS promotes efficient transport systems with minimal greenhouse gas (GHG) emissions by increasing low-cost and low-carbon mass transport networks, including BRT. The strategy also encourages non-motorized transportation (NMT) through cycling and pedestrian walkways, improved railway networks, and integrated urban transport planning.

Other national policies promote automotive fuel efficiency by recommending the use of natural gas to fuel cars, mandating this for city commuter buses, restricting vehicle imports to Euro 4+ standards, and taxing non-compliant vehicles to reduce emissions.

The National Transport Policy (2003) makes recommendations to improve NMT infrastructure in poorer areas of cities, residential areas, and peri-urban areas, including updated bus terminals, street furniture, and improved pedestrian space. It stresses congestion issues with growing transport demand, particularly in urban centres like Dar es Salaam, and proposes increased private sector participation, separating public transit into dedicated lanes, and encouraging NMT and mass transport usage. The policy also emphasizes gender-based accessibility and reduced costs for NMT in rural areas and recommends rail, tram, and water transport solutions to address street congestion.

The Tanzania Bureau of Standards (TBS) sets standards, including those for vehicle performance, safety requirements, and emissions controls, ensuring that vehicles entering the Tanzanian market meet high-quality and safety standards. The Tanzania Revenue Authority (TRA) and the Ministry of Finance and Planning (MOF&P) set applicable taxes for vehicle imports. The Land Transport Regulatory Authority (LATRA) is responsible for establishing and enforcing specific regulations for electric vehicles, including two and three-wheelers. Currently, electric three-wheelers lack comprehensive regulatory frameworks, particularly in terms of classification and licensing criteria beyond their reported capacity limitations. However, registering electric vehicles through the Tanzania Revenue Authority is currently challenging because the process has not been reviewed to include electric two and three-wheelers. Electric three-wheelers

lack comprehensive regulations as they are not classified as commuter services; they are reported to be limited to carrying three passengers and one driver to be licensed, although this limitation is not specified in legal texts. One of the major barriers to the adoption of electric three-wheelers is the high taxes and fees associated with their importation, typically amounting to 46.7%, significantly inflating their cost. LATRA's role in the electric transition would involve defining clear licensing requirements, operational guidelines, and safety standards to formalize their use and ensure they meet Tanzanian road and passenger safety standards.

1.4.4 Municipal and City Initiatives

At the municipal and city levels, national policies are often replicated, but Dar es Salaam stands out with its ambitious Climate Action Plan (CAP) aligning closely with global emissions reduction goals. The CAP demonstrates an unwavering commitment to achieving Tanzania's Nationally Determined Contributions (NDCs), aiming for a 29% reduction in emissions by 2030 and a 65% reduction by 2050. Dar es Salaam aims to promote sustainable transport modes, including ultra-low emission vehicles, and to ensure clean and secure energy sources. The city has implemented a Bus Rapid Transport program designed to enhance mobility, decrease vehicle emissions, and improve the efficiency of sustainable transit modes. Dar es Salaam established the Dar Rapid Transit Agency (DART) in 2007 to lead the transition to sustainable urban mobility. The first Bus Rapid Transit (BRT) line commenced operations in 2016, with Phase 1 comprising two lines totalling 21 km. Phase 2, spanning 20.3 km, nears completion, while Phases 3 and 4 are currently under construction. Upon full completion across six phases, the BRT network will feature 154.4 km of segregated corridors, 18 terminals, and 288 stations, integrating feeder services and non-motorized transport options near stations. Plans are underway to introduce electric buses in the future phases of the BRT network, a significant stride towards promoting low-carbon transportation in Dar es Salaam.

1.4.5 Import Taxes

Import Taxes for E-Bikes and E-Three Wheelers

Tax	Cost	Comments
Import Tax	25% for Semi Knock Down 10% for Complete Knock Down	Of production costs (all parts)
Value Added Tax (VAT)	18%	Of production costs (all parts)
Custom Processing Fee (CPF)	0.6%	Of production costs (all parts)
Railways Development Levy (RDL)	1.5%	Of production costs (all parts). Has to be paid even if railway transport is not involved
TASAC (land regulator)	1.7%	Tanzania Shipping Agencies Corporation
Weight & Measure Agency	100 000 TSH/ 45USD	Fixed amount
Clearing/ Administration fee	estimated between 2 - 5%	
Vehicle registration Tax	300 000 TSH/ ~130 USD	*This is what the importer paid; the tax is normally based on the cc of the vehicle
Shipping charges cost	local charges	local charges
CoC (Certificate of Conformity - done in Tanzania)	~5%	Of production costs (all parts)

The Vehicle Registration Tax is based on the Cubic Capacity (CC) of the vehicle; however, Electric Vehicles do not have CCs. The policy should be updated to accommodate electric motors and should create more favorable conditions for e-vehicles to increase demand. The import tax breakdown also requires more clarification.

The specific policies governing the taxation and classification of imported vehicles, including electric bicycles (e-bikes), in Tanzania, are typically set by the Tanzania Revenue Authority (TRA) and are based on customs regulations and tariff schedules.

In Tanzania, the implementation of a 10% import tax for Completely Knocked-Down (CKD) vehicles is rare, contrary to policies that theoretically support such incentives. Instead, importers have reportedly been advised that an imported electric bicycle (e-bike) can be divided into two separate packages for taxation purposes. The first package, containing components like tyres, rubber, tubes, and batteries, would incur a 25% import tax. The second package, which includes the frame and other components including the engine, would be subject to a lower 10% import tax rate. This segmentation of imports reflects an attempt to apply different tax rates based on the categorization of vehicle components, rather than the standard CKD or Semi-Knocked-Down (SKD) classifications. Importers must navigate these specific customs procedures and classifications when importing e-bikes into Tanzania, ensuring compliance with the applicable tax rates and customs regulations as advised by the Tanzania Revenue Authority (TRA) and customs authorities.

1.4.6 E-Mobility Excise Duty Exemption

In the recently proposed Tanzania budget for the year 2023/24, there is a provision to exempt excise duty on electric non-utility vehicles with only electric motors for propulsion, as well as Compressed Natural Gas (CNG) vehicles. This exemption applies to vehicles falling under specific HS codes: 8702.40.11; 8702.40.19; 8703.80.10; and 8703.80.90, which refer to electric and CNG-powered buses and 3-wheelers. The purpose of this measure is to promote the use of electricity and natural gas within the country, reducing reliance on imported fuel and saving foreign currency.

02

Gap Analysis

According to a World Bank report (2021), in intermediate cities, road space is scarce in Tanzania and is mostly dedicated to motorized transport, constraining its efficient use. Road networks are of poor quality, increasing transport costs and obstructing access to some areas of the cities. Only a small share of roads is paved, although those that are paved tend to be in reasonable condition. Seventy-five percent of paved trunk and regional roads managed by TANROADS and 68% of paved urban roads managed by TARURA are in "good" or "fair" condition. In city centers, road space is allocated mostly to motor vehicles over more sustainable and widely used modes of transport. Though about half of the population travels by foot in Tanzanian cities, most of the road space is devoted to motorized vehicles. On average, 81% of the road space is allocated to motor lanes and an additional 7% is allocated to on-street parking; whereas less than 10% of the population uses private cars. In the context of Tanzania, several transportation and mobility challenges are evident:

- **Used Vehicle Dependence**: Tanzania heavily relies on used vehicles, with used light-duty vehicles comprising a significant portion of the total vehicle fleet. This reliance on used vehicles poses challenges such as high pollutant emissions and lack of safety measures for the vehicles
- **Infrastructure Challenges**: Tanzania faces issues related to road infrastructure, with many roads failing to meet acceptable standards for pedestrians and cyclists. This situation can pose risks to vulnerable road users and hinder overall road safety. Tanzanians spend a considerable amount of time walking or cycling for transportation purposes. For low-income households, these modes of transport can represent a substantial portion of their daily activities and expenses. As mentioned above, up-to-date figures on national modal share are yet to be available, in 2018, 45% of all trips happening in the Tanzanian capital were on NMT modes.[1]
- **Limited Public Transport Access**: Access to formal or informal public transport within a convenient walking distance is restricted in Tanzania. In 2020, a relatively small percentage of the population had access to public transport within a 500-1,000-meter walking distance, which falls below the global average.
- **Informal Transport Sector**: Informal transport systems play a substantial role in Tanzanian cities with the use of *daladalas* (minibuses) and three-wheelers (bajajs), contributing to a significant share of public or shared transport trips.
- **Road Dominance**: Roads are the primary mode of transport in Tanzania, responsible for transporting a large portion of goods and passengers due to limited alternatives such as rail transport. This heavy reliance on roads presents challenges related to road maintenance, congestion, and road safety.

1. DART (Dar Rapid Transit Agency), https://www.dart.go.tz/

Addressing these transportation challenges is essential to improving accessibility, safety, air quality, and affordability for Tanzanians. Sustainable transportation strategies and investments in infrastructure are crucial to addressing these issues and supporting economic development and mobility in Tanzania. In addition, Low Emission Zones (LEZs) are tools that cities are using more and more in addition to Traffic Demand Management strategies to help address issues like congestion, air quality, and road safety[2].

2.1 Non-motorized transport

Non-motorized Transport (NMT) in Tanzania is a common mode of transportation for many people. Although up-to-date figures on national modal share are yet to be available, in 2018, 45% of all trips happening in the Tanzanian capital were on NMT modes.[3] Local and national administrations have been increasingly recognizing the importance of promoting NMT for various reasons, including reducing urban congestion, improving public health, reducing road incidents, and mitigating environmental impacts. Still, such efforts have yet to materialize into a national NMT strategy. Walking and cycling have also played a vital role during the COVID pandemic, proving essential for a safe and resilient transport system. Several factors influence the state of NMT in the country, and addressing them or not will contribute to increasing their modal share in the years to come:

- **Urbanisation:** In rapidly growing urban areas, walking and cycling play a crucial role, as public transport alternatives are often insufficient or unreliable, and private vehicles are too expensive for the majority. Integrating NMT strategies into Tanzania's agenda would turn cities and towns into more accessible, inclusive, and liveable urban environments.

- **Infrastructure:** The quality of public spaces and NMT infrastructure also influence how people interact with their environment. Designing public spaces with a people-centered approach and improving access to pedestrian pathways and cycling lanes will bring more people onto the streets and encourage them to consider NMT as their primary mode of transport.

- **Safety and Security:** Road fatalities in Tanzania are 29,2 per 100.000 inhabitants. In 2016, total deaths added up to 16.252; 30% and 6% were pedestrians and cyclists, respectively.[4] This makes the safety of NMT users a national concern for the government. Inadequate infrastructure, specifically poor road design and lack of signage and lighting pose extra risks to the users of vulnerable modes, but the responsibility is shared. Road safety is a multifaceted challenge that requires ongoing efforts and coordination across various sectors. Civil society, the private sector, and NGOs should collaborate with the Tanzanian government and openly support awareness campaigns, implementation of regulations for commercial vehicles and speed limits, better driver training and licensing, etc. Innovative road safety solutions can also be fostered with public-private partnerships.

- **Policy and planning:** The lack of NMT policies and planning in the last decades resulted in the car-centered society that defines the largest Tanzanian cities. This model marginalizes pedestrians and cyclists and has proved unsustainable for the environment. Without urgent action, the situation won't be fixed within the time frames established by the Paris Agreement. Some cities are starting to incorporate NMT policies into their urban planning strategies, but there

2. https://www.itdp.org/publication/the-opportunity-of-low-emission-zones-a-taming-traffic-deep-dive-report/?utm_source=Sustainable+Transport+e-bulletin&utm_campaign=15d1d32688-Mid_Summer_2017_eBulletin_COPY_01&utm_medium=email&utm_term=0_fca8d7a24c-15d1d32688-135942648&mc_cid=15d1d32688&mc_eid=1d6d3aa82c

3. DART (Dar Rapid Transit Agency), https://www.dart.go.tz/

4. Global Status report on Road Safety (WHO), 2018

is still a long way to go. Tanzania must integrate them at local and national levels with the support of national stakeholders and international organizations.

2.2 Public Transport

Public transport in Tanzania is synonymous with buses and *daladalas*, apart from two rail lines that link Dar es Salam with the other national, major economic hubs and a few ferries that connect the cities near bodies of water with nearby towns and islands. Public transport services are generally concentrated on the major arterial roads with little penetration to peri-urban areas and newly developed neighborhoods. In rural areas, public transport options are limited. There, people rely on shared taxis and motorcycles (boda-bodas) for distances that can't be covered by walking or cycling. In Dar es Salaam, two initiatives have been implemented in the last decade to ease road congestion in the city: the Commuter Rail and a BRT line. These modern systems brought international attention to Tanzania and, especially the new BRT line, has been praised as models to solve many of the traffic-related problems that the most prominent African cities currently have. Still, the country's overall services remain relatively poor.

Currently, most of the country's urban population does not have convenient access to public transport.[5] Tanzania's performance on the SDGs Indicator 11.2.1, which gives the proportion of the people that live less than 500 m away from the nearest public transport station, is very poor. The only city reported in the database is Arusha, with almost 22% of its population living close to public transport infrastructure. The lack of data from the rest of the country flags the need for improvement in the sector. Without access to accurate data, it will be hard for policymakers to identify areas for improvement and make informed decisions.

Data, however, is one of the many challenges that slow down public transport development. Overcrowding of vehicles and poor maintenance of the infrastructure can affect the quality and reliability of the services, and in large urban areas, safety and inclusivity are concerns for vulnerable groups. A significant investment in infrastructure would improve the performance of public services, but it should come together with an integration of public transport into urban planning. Safety measures can be improved by enhancing regulations on vehicle safety standards, guaranteeing driver qualifications and well-being, and investing in public awareness and data collection efforts.

Recent efforts on digitalization of transport systems and electrification of *daladalas* are good examples of how Tanzania has started to take public transport as seriously as it deserves. Innovation and modernization play a crucial role in improving public transport performance. The BRT corridor opened in 2016, provides safe and reliable passenger transport to an average of 165,000 Dar es Salaam commuters daily and has consistently reduced traffic congestion along the area it serves[6]. The Dar BRT transport agency introduced the *Mwendokasi* Application in 2022 to help Dar es Salaam residents book and plan trips. Maintenance and availability of the mobile application need more support to increase its adoption and usage. Going hand in hand with this, the DART agency has made use of Intelligent Transport Systems (ITS) to manage the operations of the BRT system and currently exploring how to integrate this with other on-demand feeder systems like the electric three-wheelers.

2.3 Urban Freight

Although road space is necessary for the transportation of goods, freight transport can benefit from making more road space available for freight, instead of private cars, and reducing unnecessary travel. There is no definitive answer to the question of the most efficient infrastructure for freight. It is not necessarily the case that large trucks need access to all parts of the city; this can be the result of an oversupply of roads,

5. UN-Habitat metadata on SDGs Indicator 11.2.1, https://data.unhabitat.org/datasets/04c64cb5553843b8a644af6429b6633c/explore?filters=eyJDb3VudHJ5IjpbIlRhbnphbmlhIl19

6. UDART, https://udart.co.tz/

effectively subsidizing unnecessary long roundtrips by the largest freight vehicles. More constrained road supply can result in freight operators breaking their shipments into smaller consignments for shorter point-to-point deliveries in smaller vehicles. Active management of roads for freight purposes, either by limiting access to large trucks or limiting other traffic but permitting trucks, allows for even more nuanced control. The appropriate supply of road space for freight purposes and management of that space are matters for study and planning in each city. There is no one-size-fits-all policy.

2.4 Travel Demand Management

Transport Demand Management - TDM (also referred to as "Travel Demand Management") comprises a set of policies, strategies, and action plans designed to change and reduce demand for car use through changes in travel behavior[7]. Travel Demand Management (TDM) in Tanzania plays a pivotal role in addressing the country's growing transportation challenges. With urbanization on the rise and increasing demands on the transportation infrastructure, TDM strategies aim to optimize the use of existing resources while reducing congestion, emissions, and travel times. In Tanzanian cities like Dar es Salaam, where traffic congestion is a significant concern, TDM initiatives may involve promoting public transportation, introducing congestion pricing mechanisms, developing dedicated bus lanes, and implementing policies that encourage carpooling, cycling, and walking. These strategies not only enhance mobility but also contribute to environmental sustainability and improved quality of life for Tanzanian citizens. TDM efforts in Tanzania are essential to creating a more efficient and sustainable transportation system, aligning with the country's development goals and aspirations.

7. https://www.gtkp.com/themepage/gtkp-archives/environment-climate-change/climate-change/demand-management/

Pilot of Urban freight on bicycles

The SOLUTIONSplus project carried out a pilot using peddle-assist electric bicycles to solve the challenge of urban deliveries in Dar es Salaam. The FASTA cycling cooperative provided delivery services for the Aga Khan hospital. The pilot promoted the local assembly of electric bicycles provided by EURIST and FABIO at the Dar es Salaam Institute of Technology (DIT). From a survey carried out with the riders, their top challenge was the lack of non-motorized transport infrastructure that would provide them safety while on their trips.

2.5 Transit Oriented Development (TOD)

Tanzania, like many other African developing countries, faces urbanization challenges, such as rapid population growth, inadequate infrastructure, limited accessibility to basic services, and heavy air pollution. Implementing TOD principles could offer several benefits to Tanzanian cities. Including more compact, mixed-use urban space would improve economic productivity and boost competitiveness, and reducing dependence on private fossil-fuel-powered vehicles. TOD would relieve the burden on road infrastructure, improve the air quality and increase accessibility to basic services to middle and low class.[8] Although the benefits are clear, the extent to which TOD has been actively implemented in the country has been limited, at least until a few years ago. There might be several reasons for this. Implementing TOD requires a long-term and holistic approach that integrates land use, transportation, and community development

8. http://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_policy/@invest/documents/meetingdocument/wcms_asist_4801.pdf

goals. Limited resources for coordination and collaboration amongst stakeholders, lack of public support, securing funding, and long-term commitments are the challenges that need to be overcome.

However, the situation is slowly changing. An increasing interest in integrating NMT and public transport strategies into the national agenda confirms that Tanzania is catching up with TOD. The construction of the already mentioned BRT, in Dar Es Salaam, will ensure dense and compact urban development, bringing in economic and social activities throughout the whole BRT corridor. The project will connect more areas of the city when the upcoming phases 3, 4, and 5 are completed, expanding urban development to further areas.[9] The Tanzania Cities Transforming Infrastructure and Competitiveness project (TACTIC), started in 2022 and funded by the World Bank's International Development Association, will support the implementation of these phases and more access to urban infrastructure in key areas to service the urban poor and vulnerable population. Altogether, TACTIC plans to serve at least seven million residents in Tanzania's secondary cities through strengthened urban management and access to better infrastructure and services.[10]

2.6 Electric mobility

As part of the Solutions Plus project towards improving and finalizing the Electric Mobility Policy Advice paper for Tanzania, a co-creation workshop was held to discuss and formulate solutions to the gaps and barriers to the introduction of electric mobility in Tanzania. The discussions were guided by priority areas identified through research interviews with stakeholders conducted by the Africa Electric Mobility Alliance (AfEMA). A design thinking approach was applied to guide the stakeholders in identifying the barrier (challenge) to each priority area and co-formulating solutions to the challenges decelerating the adoption of electric mobility in Tanzania. The outputs envisioned following the implementation of the solutions include an increase in EV adoption, local production, and job creation. The outcomes of these impacts will benefit the EV market in Tanzania through better products and pricing and improve the socio-economic aspects of all stakeholders across the electric mobility value chain, including women. In the context of electric mobility in Tanzania, several priority areas and challenges are discussed below.

- **Harmonization of EAC and National Policies:** Unfortunately, there are very few EAC-wide regulations that support electric mobility. The existing ones are almost exclusively expressed in the EAC customs tariffs book, which is being updated every 5 years (last update 2022). This lack of harmonization makes it extremely hard for 1. Local authorities to have a clear decision base as they are confused as to whether to refer to EAC or national policies since some of those regulations may contradict each other. As a result, enforcement of existing rules becomes a challenge. Companies have challenges scaling across countries as electric vehicles are treated differently depending on a country's tax regime for example
  - Tanzania is dropping excise taxes on electric vehicles and buses
  - Uganda is dropping import duties on electric motorbikes only
  - Kenya is dropping VAT on all segments except 4-wheelers.
- **Registration of Electric 2-wheeler vehicles:** The importation paperwork provided by the Tanzania Revenue Authority (TRA) for 4 and 2-wheeled vehicles is not updated to accommodate the import of electric vehicles. The form requires the engine size in Cubic Centimetres (CC), while the capacity of

9. https://africa.itdp.org/optimising-brt-operations-in-dar-es-salaam/

10. https://www.worldbank.org/en/news/press-release/2022/06/13/tanzania-seven-million-urban-residents-to-access-improved-infrastructure-and-services#:~:text=%E2%80%9CRapid%20urbanization%20and%20increased%20population,people%2C%20industries%2C%20and%20markets.

electric vehicles is measured in Kilowatt power as they do not have engines. This renders the importation of Electric vehicles more taxing.

- **Lack of Standards**: As of November 2022, there were no standards for electric mobility, EV charging, or related products and processes in Tanzania. There is a need to identify and implement safety and quality standards for electric vehicles and products.

- **Electricity tariffs and grid readiness**: Only 40 percent of the Tanzanian population have grid access. The grid capacity also runs the risk of being unreliable when exposed to dynamic changes. However, the Tanzania government has an ambitious goal to electrify 75 percent of the country by 2025. Anecdotal reports and the increase in grid capacity point towards an improvement in grid reliability in Dar es Salaam and the rural areas, over the past several years. Electricity tariffs in Tanzania are relatively low compared to other East African countries. For households in Tanzania, the electricity price is TZS 229.59 per kWh, which is approximately USD 0.088 per kWh. In comparison, the electricity tariff in Kenya is significantly higher. For instance, in Kenya, the price for consumption above 100 kWh is approximately KES 20.97 per kWh, which converts to around USD 0.1446 per kWh. Additionally, there is potential for further reductions in electricity tariffs in Tanzania, which could make electricity even more affordable for consumers in the future. This disparity highlights the cost difference in electricity tariffs between Tanzania and Kenya, emphasizing the affordability of electricity in Tanzania. Additionally, there is potential for further reductions in electricity tariffs in Tanzania, which could make electricity even more affordable for consumers in the future. The construction of the Julius Nyerere Hydropower Station is expected to contribute to lower electricity tariffs in Tanzania. The increased supply of low-cost, renewable energy will enable the government to reduce the cost burden on consumers, making electricity more affordable for households and businesses alike.

- **Financing**: Securing finance through grants, equity or debt is a challenge for electric mobility startups in Tanzania. There is a need to reposition these companies to make them attractive to investors and potential funders.

- **Research and Development for e-buses**: Tanzania lacks a local supply of Electric buses. Electric mobility companies in Tanzania do not provide/supply electric buses but are focused on scooters, mopeds, motorcycles, electric three-wheelers, and safari vehicles. There is low input into research and development by Asian and foreign manufacturers to produce electric vehicles that fit the Tanzanian context – intense usage, elevated temperatures, and significant dust amounts. In addition, market orders from Tanzania for e-vehicles are small and not a high priority for manufacturers. This has slowed the process of adjusting manufacturing to serve the Tanzanian and African markets.

- **Ecosystem Development**: The local start-up ecosystem lacks institutional support that can facilitate finance mobilization and introductions to investors, educational programs, publishing policy documents, and convening workshops, roundtables, and electric mobility forums. There is a need to establish supportive institutions that can promote the growth of the electric mobility sector in Tanzania by coordinating these efforts. The Tanzania electric mobility ecosystem has emerging bodies advocating and promoting electric mobility. However, there is a need to establish a strong unified lobbying body.

- **User Education**: Consumers lack awareness of electric mobility and the electric mobility environment in Tanzania. There has been little to no direct effort from the government to build

this awareness amongst Tanzanians. Electric mobility companies have also engaged in very little publicity efforts. There is a need to establish the role of all the different stakeholders in promoting consumer awareness of electric mobility.

- **Capacity Development**: The local workforce in electric mobility environments has low technical capacity. The electric mobility value chain offers an opportunity to employ the youth in Tanzania.

- **Incentives** -Tanzania lacks specific incentives for the import, manufacturing, assembly, or import of electric vehicles.

- **Taxes**- Import taxes are exceedingly high. Import duty, excise duty, VAT, and other payments can reach up to 100 percent of the value of the imported vehicle, making Electric vehicles much less affordable to average Tanzanians. In addition, companies do not receive the tax benefits they duly deserve. For example, completely knocked-down kits (CKD) should engender only a 10 percent import duty instead of the 25 percent for semi-knocked-down kids (SKD). However, companies importing vehicles as CKD have reported not being able to access the 10 percent CKD rate.

03

Recommendations for a NUMP Framework

The framework for Tanzania's National Urban Mobility Plan (NUMP) focuses on establishing strong governance mechanisms to ensure effective coordination at national and local levels. This involves clearly defining roles and responsibilities among governmental bodies to facilitate seamless implementation and monitoring of mobility policies. Local participation is important for fostering ownership and understanding of local transportation challenges while engaging the public and civil society ensures that policy recommendations are inclusive and transparent. By integrating these stakeholders into decision-making processes, NUMP aims to develop transportation solutions that address urban mobility challenges and align with community needs, promoting sustainable and equitable development across Tanzania. Achieving the ambitious goals set out in Tanzania's Mobility Plan will require consistent progress, strong political commitment, adequate funding, and broad public support.

3.1 Closing the Gap- Policy Recommendations

Within the framework of NUMP, there are several key policy recommendations aimed at transforming Tanzania's transportation infrastructure and practices. These recommendations include enhancing non-motorized transport (NMT) infrastructure, improving public transport services, effectively managing urban freight, implementing travel demand management strategies, promoting transit-oriented development (TOD), fostering the adoption of e-mobility, and integrating renewable energy solutions. These measures collectively aim to address current mobility challenges, promote environmental sustainability, and enhance overall urban transportation systems throughout Tanzania.

3.1.1 Non-Motorised Transport

Tanzania's first and foremost priority is to **develop a national NMT policy/strategy** that defines a common vision for improving walking and cycling throughout the country. This comprehensive document should serve as a guide for more specific mobility plans on street design, parking management, or road safety. An in-depth assessment of the existing walking and cycling situation is mandatory to start developing the document, which should be done by combining research and field studies and involving consultation of different stakeholders (private sector) and national institutions (public sector). Furthermore, information about ongoing transportation projects (new BRT lines, bike-sharing programs) should be gathered, and the NMT facilities should be assessed. The presence of wide footpaths and safe pedestrian crossings, the existence of bike lanes along newly developed street designs, and the provision for traffic calming measures or street lighting all define the state of practice concerning NMT.

Tanzania has been working for years on NMT projects, and data such as transport master plans, urban development plans, transport legislation, and road safety data should be readily available. The same goes for demographic data, travel behavior, and travel data. It is recommended to focus efforts on **improving the institutional capacity**, which includes not only p utting a dedicated NMT team on the task of elaborating the NMT strategy but also providing capacity building and study tours to the several institutions related to NMT such as transport agencies, traffic police, public health departments, etc.

A multi-disciplinary team can provide a better assessment of the situation. Transport and urban planners should collaborate with experts on housing, education, public health, etc. Also, to understand the needs of all people of the city, policy writing should include explicitly the needs of women, children, and persons with disabilities. By leaving no one behind in the consultation process, the new policy will be more comprehensive and approved by both government and citizens. **Including engagement activities throughout the process**, from the assessment stage to the final drafting, is recommended. Field surveys and interviews, meeting with focus groups, open street events, marketing campaigns, and stakeholder forums are excellent participatory activities that can help develop an inclusive and successful NMT policy.

3.1.2 Public Transport

To improve urban mobility standards in Tanzania, it is primarily imperative that public transportation is improved. The service of public transportation in urban areas can be upgraded in several aspects. **Public transportation services should be expanded within Dar es Salaam and in other growing cities in the country**. Additionally, it is important to address patrons' needs regarding the perceived unreliable, dirty, and crowded nature of public transportation to make it a more attractive option for urban dwellers. This can be facilitated by enforcing rules regarding limiting the number of patrons per cabin, the acceptable behavior in public transportation, and expanding the fleet. Moreover, it is important to make sure that **public transportation is safe and inclusive for marginalized and vulnerable groups**, namely women, and people with disabilities and/or low income. The specific policies that would address their needs can be derived by conducting surveys with the aforementioned groups and evaluating their responses. It would also be helpful to explore the idea of formalizing the informal public transport sector to increase the fleet of public transport services as investments from formalized public transport are still being developed. Formalizing the informal public sector can help with enforcing vehicle and driver regulation standards to improve the experience of patrons using public transportation.

The generation, collection, and publication of data can help facilitate making informed decisions to improve the experience of patrons. Facilitating the digitalization of public transportation services can help with the generation and collection of data. The publication of data can provide insights for people to create products to improve public transportation through the private sector.

It would also be beneficial to be proactive in implementing the electrification of the BRT to further reduce public transportation's environmental impact.

3.1.3 Urban Freight

To address the challenge of urban deliveries in Dar es Salaam and other rapidly urbanizing cities in Tanzania, prioritizing the safety and efficiency of non-motorized transport infrastructure emerges as a crucial policy recommendation. The focus should be on enhancing and expanding dedicated lanes and pathways for bicycles and other non-motorized vehicles. This involves allocating adequate space specifically designed for safe and smooth passage, ensuring the safety of riders while delivering goods within the city. Additionally, adopting a city-wide approach to actively manage and designate road space for freight purposes, considering the use of smaller vehicles for point-to-point deliveries,

can optimize urban freight operations. Policy initiatives should entail a comprehensive study of city-specific needs and traffic patterns to effectively manage road supply, potentially restricting access to certain types of vehicles while facilitating the movement of freight vehicles. Furthermore, public-private collaborations can be instrumental in developing tailored solutions and infrastructure improvements to support the use of electric bicycles and other sustainable modes of urban freight, ensuring a safer and more efficient delivery ecosystem.

3.1.4 Travel Demand Management

Transport demand management is integral to facilitating the improvement of urban mobility. There are several means to manage travel, for example, congestion pricing. Congestion pricing can be implemented in areas that are well-serviced by public transportation during hours of high demand, for example, the central business district during weekday mornings and evenings. The implementation of congestion pricing can be improved using data-intensive systems that track travel demand in real time and are responsive to changes in demand. Regarding transport demand management, the improvement of public transportation services can mitigate travel demand given the fact that public transport carries more people in less space than private cars thus reducing congestion. Additionally, while BRT fleets are still increasing, there can be a process for formalizing the informal public sector and allowing *daladalas* in the formal scheme to use the BRT lanes to alleviate congestion in Dar es Salaam. Travel demand can also be managed by building infrastructure for safe, inclusive non-motorized transport such as cycling, and walking in cities. Carpooling campaigns can also reduce congestion by increasing the number of passengers per car during periods of high transport demand.

3.1.5 Transit-Oriented Development

The policy recommendations for TOD are intrinsically interlinked with the development of an NMT strategy. A long-term and holistic planning approach is required to address the challenges related to rapid population, growth, inadequate infrastructure, and limited accessibility to basic services. Land use, transportation, and community development goals must be integrated into urban planning policies by the collaboration of different stakeholders with the government and their long-term commitment.

Furthermore, the government should actively work on generating public support and awareness for TOD principles. This can be achieved through public education campaigns, community engagement initiatives, and involvement in the decision-making process. Building a consensus among the public and stakeholders is crucial for the successful implementation of TOD, and the government should allocate resources to communicate the benefits of TOD, address concerns, and involve citizens in the planning and decision-making processes.

And all of this cannot be done without financial commitment. The government should establish financial mechanisms for the implementation of TOD principles. This includes exploring partnerships with international organizations, development agencies, and private investors, or fostering collaboration between the public and private sectors, as demonstrated by initiatives like TACTIC.

3.1.6 E-Mobility

The proposed E-mobility incentives outlined present a comprehensive strategy to drive the widespread adoption of electric vehicles (EVs) while bolstering the necessary infrastructure in Tanzania. These proposals encompass a multi-faceted approach, starting with non-tax incentives aimed at encouraging individuals and businesses to embrace EV technology. Such incentives might include tariff reductions specifically tailored for EV charging and manufacturing, alongside a free grid connection program for charging stations, forming the backbone of infrastructure development. This program not only facilitates the installation of essential equipment but also incentivizes the growth

of a robust charging network critical for widespread EV use.

Moreover, the suggested recommendations extend to fiscal measures, advocating for 0% duties and VAT on vital components such as LED, batteries, and charging infrastructure, effectively lowering manufacturing costs. Financial support mechanisms in the form of low-interest loans and government-backed microfinance empower consumers and businesses to invest in EV technology with reduced financial burdens. Complementing these initiatives are proposals for EV-exclusive zones, promoting a dedicated space for electric vehicles with tailored infrastructure and services. Additionally, the establishment of green and industrial parks focused on EV innovation and production can serve as a catalyst for technological advancements and sustainable growth in the automotive sector. Collectively, these policy recommendations create a cohesive framework designed to drive EV uptake, stimulate infrastructure development, alleviate financial barriers, and foster innovation in the burgeoning green automotive industry.

Moreover, it is recommended that the government provides a procedure for the registration of converted vehicles from internal combustion engines to electric vehicles (EVs) to ensure compliance with safety and regulatory standards. This would include inspection by certified authorities to verify modifications and updated technical specifications reflected on the electric components installed is crucial.

To address the lack of standards, it is recommended that policies be developed that support the establishment and enforcement of comprehensive standards across various critical aspects of electric vehicles (EVs) in Tanzania. This standard can advocate for the formulation and implementation of stringent regulations regarding EV dimensions, robust standards for EV battery safety and testing, and ensuring stringent protocols for battery performance, durability, and safety assessments. Furthermore, the standards could also emphasize the need for comprehensive end-of-life management standards, particularly focusing on the safe disposal and efficient recycling of EV batteries to minimize environmental impact. Lastly, an overarching emphasis on EV safety standards and regulations is necessary in the policy recommendations, underlining the need to ensure stringent safety protocols and regulatory measures across the spectrum of electric vehicle operations and functionalities.

Tanzania holds immense untapped potential in renewable energy sources, and leveraging this abundance stands as a cornerstone for sustainable development. One pivotal strategy involves embracing distributed electricity generation by encouraging smaller, decentralized energy production units across the country. Exploring dynamic pricing mechanisms such as peak shaving and valley filling offers a promising avenue to balance energy demand, flattening load curves, and ultimately driving down tariffs for consumers. Simultaneously, investing in grid flexibility emerges as a critical initiative, enhancing resilience and responsiveness to dynamic changes within the energy landscape. To further incentivize progress in this realm, fostering an environment conducive to the deployment of renewable energy through targeted incentives is crucial. This proposed approach not only harnesses Tanzania's renewable potential but also introduces innovative strategies to optimize energy utilization, enhance grid resilience, and incentivize the sustainable transition towards a cleaner and more efficient energy ecosystem.

In a concerted effort to accelerate the growth of electric mobility in Tanzania, the government can take a multifaceted approach focused on incentivizing and attracting investment in this sector. Offering tax holidays and exemptions to electric mobility companies constitutes a pivotal step, alleviating financial burdens and fostering a conducive environment for their establishment and expansion. Additionally, the provision of loan guarantees on specific percentages could mitigate investment risks, and encourage financial institutions to support and invest in these innovative ventures. Moreover, the government can

roll out strategic initiatives and programs tailored to entice investors into the electric mobility space, showcasing Tanzania's potential and offering incentives that aim to attract both local and foreign investment. This comprehensive strategy underscores the nation's dedication to nurturing a robust electric mobility ecosystem, leveraging incentives, financial backing, and proactive government initiatives to spur growth and innovation in this transformative industry.

3.2 Plan

In the pursuit of developing a Tanzania NUMP, capacity development is going to be necessary for the citizens, and local and national government units.

Stakeholder Group	Capacity Development and Awareness
User Education (citizens)	a. Organise trade events for electric mobility associations to showcase electric vehicle products. b. Promote the adoption of hybrid electric vehicles in the transition phase. c. Explore more opportunities for employment in the electric mobility supply and demand side. d. Develop electric mobility educational programs in primary and secondary school curricula to build awareness from an early stage. e. Establish partnerships with existing ICE stakeholders.
Capacity Development	a. Review existing tertiary academic curriculum to include electric mobility. b. Promote research and development on electric mobility financing. c. Establish special programs for technicians and other stakeholders to manage low carbon transition to clean transportation.

3.3 Monitoring and Evaluation

Monitoring and evaluation (M&E) is a crucial component of the Tanzania National Urban Mobility Plan (NUMP) framework to ensure effective implementation and measure progress towards set goals and targets. The M&E process involves systematic tracking, assessment, and reporting of key indicators related to the plan's objectives across various sectors, including non-motorized transport (NMT), public transport, urban freight, travel demand management, transit-oriented development (TOD), e-mobility, and capacity development.

1. **Indicators and Targets**: The first step in M&E is defining clear indicators and targets for each component of the NUMP. Indicators could include the number of kilometers of dedicated bike lanes constructed, the percentage reduction in public transport commute times, and an increase in the use of electric vehicles. Targets set specific numerical or qualitative goals that the plan aims to achieve within defined timeframes.
2. **Data Collection**: Data collection methods should be robust and consistent to provide accurate information for assessment. This may involve periodic surveys, data from transport agencies, urban development plans, road safety reports, and demographic studies. Data should cover aspects like infrastructure development, mode shares, travel patterns, safety records, and environmental impacts.
3. **Reporting and Analysis**: Regular reporting on progress is essential to keep stakeholders informed and accountable. Reports should analyze collected data against established indicators and targets, highlighting achievements, challenges, and areas needing improvement. Analysis may also include comparisons with baseline data to measure change over time and identify trends.
4. **Feedback Mechanisms**: Feedback loops ensure that insights from monitoring inform decision-making and policy adjustments. Stakeholder consultations, workshops, and forums can gather qualitative feedback from citizens, experts, and policymakers to supplement quantitative data. This feedback helps refine strategies and address emerging issues.
5. **Review and Adaptation**: Periodic reviews of the NUMP ensure its relevance and effectiveness amidst changing circumstances. Evaluations should assess the impact of implemented policies and interventions, identifying successful practices and areas requiring adjustments. This adaptive approach ensures continuous improvement and alignment with evolving urban mobility needs.
6. **Capacity Building**: Building institutional capacity for M&E is crucial. This involves training staff involved in data collection, analysis, and reporting, as well as ensuring access to reliable data collection tools and technologies. Strengthening M&E capabilities enhances the plan's ability to track progress accurately and make informed decisions.
7. **Public Transparency and Accountability**: Transparency in M&E processes, including public access to reports and findings, fosters accountability and builds trust among stakeholders. Regular dissemination of results through accessible platforms promotes engagement and involvement in urban mobility initiatives.