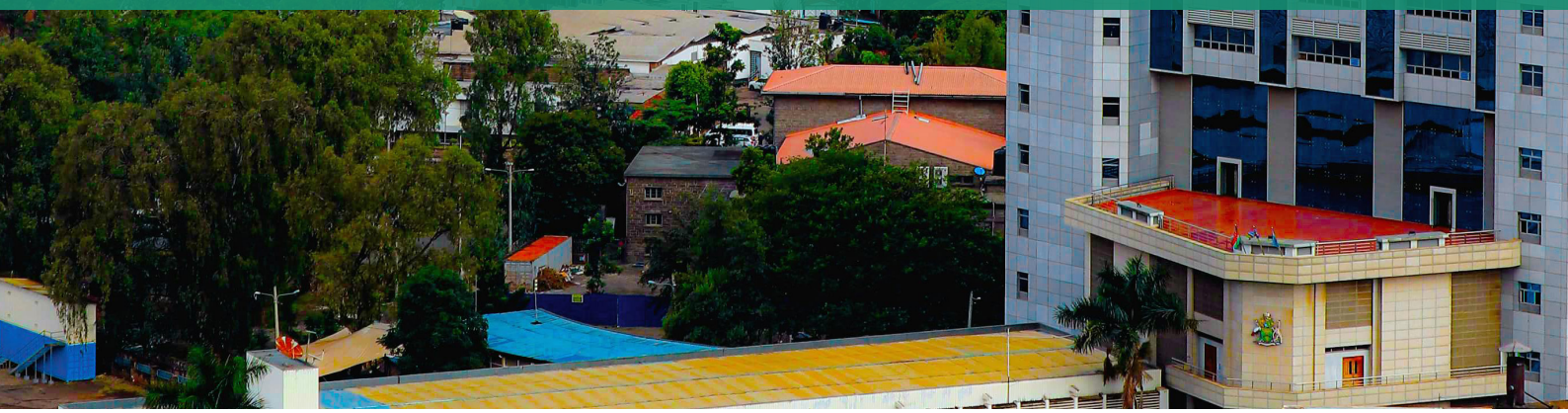
CITY ROADMAP FOR E- MOBILITY:
NAIROBI CITY COUNTY



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PROJECT PARTNERS

ABOUT

To provide a guideline for E-mobility project in the City of Nairobi

TITLE

City Roadmap for E- Mobility –
Nairobi City County

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DISCLAIMER

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All the other pictures are provided by the SOL+ partners

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City Roadmap for E- Mobility – Nairobi City County

UN environment programme

Executive Summary

The main purpose of this roadmap is to lay the steps leading to the formal introduction and adoption of Electric Vehicles (EVs) in the City County of Nairobi. It signifies the quest on the part of stakeholders to regularize a transition currently underway and for which some guiding policy and legal actions are urgently required.

It supports the National government's commitment to the Paris Agreement of 2016 to reduce GHG emissions to zero by 2050. It also speaks to the various policies and legislations related to climate change that the Kenyan government has formulated to achieve this goal amongst other objectives. These include and are not limited to: the Climate Change Act of 2016, the National Climate Action Plan, the Integrated National Transport Policy and the National Energy and Petroleum Act of 2018. A National Policy on E-Mobility is now at the draft policy stage awaiting approval by Parliament.

The report outlines some of the key activities currently undertaken by Nairobi City County which form part of national efforts to stem climate change hazards. It emphasizes Nairobi's place amongst 11 other Cities in Africa, selected by C40 Cities to prepare climate action plans to help cut GHG emissions from the transport sector. The Nairobi City County Climate Action Plan 2020-2050 provides a perfect background against which to implement an E-mobility strategy for the city

The roadmap allows various stakeholders including the general public to appreciate the context in which the e-mobility transition is being carried out in the City County of Nairobi. By defining the present e-mobility landscape, the roadmap strives to paint a clear picture of the situation prevailing in Nairobi and its environs. It attempts to profile the range of EVs in the market and key actors in the sector while auditing the state of infrastructure for charging and battery swapping. Essentially, it attempts to define the state of e-mobility as currently constituted along the entire value chain in Nairobi City County.

The roadmap describes the existing policy environment in which e-mobility is being implemented. It underlines key challenges that need to be addressed across different sectors from energy, transport, finance and urban planning. A significant amount of policy re-engineering will be required to keep up with the pace at which e-mobility sector is emerging in Kenya.

In the roadmap, the Vision of Nairobi for e-mobility is clearly outlined for all stakeholders to appreciate their role in the entire process. The summarized Vision positions e-Mobility in Nairobi as a strategy for;

a. Reduction of GHG emissions in Nairobi.
b. Reduction of GHG emissions (67% CO2), 11% GHG) directly attributed to the transport sector in Kenya to which Nairobi is the principal contributor
c. The reduction of Nairobi's overall contribution to Co2 and GHG emissions in Kenya to zero by 2050.

Finally, the roadmap provides steps for establishing the Infrastructure requisite for the e-mobility transition in Nairobi City County, the policy framework necessary for facilitating the transition to e-mobility that will ultimately position the City as a leader in electric mobility in Africa. It seeks to install e-Mobility in Nairobi as a vehicle for reduction of GHG emissions and help to contribute to Kenya's targets as set out in the Nationally Determined Contribution (NDC) towards global efforts to stem climate change.

List of Abbreviations

AfeMA	Africa E-Mobility Association
BCS	Battery Charging Station
BMS	Battery Management System
BSS	Battery Swapping Station
CBD	Central Business District
CCN	City County of Nairobi
CPO	Charging Point Operator
EMAK	Electric Mobility Association of Kenya
E-MSP	Electric Mobility Service Provider
EPRA	Energy and Petroleum Regulatory Authority
EV	Electric Vehicle
EVCI	Electrical Vehicle Charging Infrastructure
EVSE	Electric Vehicle Supply Equipment
ICC	International Chamber of Commerce
KEBS	Kenya Bureau of Standards
KURA	Kenya Urban Roads Authority
NaMATA	Nairobi Metropolitan Area Transport Authority
NIUPLAN	Nairobi Integrated Urban Plan
NTSA	National Transport Safety Authority
OMCS	Oil Marketing Companies
PCS	Public Charging Station

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1 Introduction

1.1 Introduction

The Government of Kenya and many other countries have signed the Paris Agreement of 2016 to reduce GHG emissions to zero by 2050. The government has formulated several related policies and enacted appropriate legislation to achieve this goal amongst other objectives. The Climate Change Act of 2016, the National Climate Action Plan, the Integrated National Transport Policy and the National Energy and Petroleum Act of 2018 are some of the efforts that have been expended towards meeting the global objectives set out in Paris in 2016.

Nairobi City County has been prioritized as one of the 11 cities in Africa to prepare a Climate Action Plan to help cut GHG emissions from the transport sector while at the same time supporting efforts to transition the city into clean and non-motorized transport mobility. The Nairobi City County Climate Action Plan 2020-2050 provides a perfect background against which to implement an E-mobility strategy for the city.

The Nairobi Climate Action Plan has prioritized managing hazards related to; floods and storms; heat; and drought and has targeted action at the city scale for intervention with both adaptation and mitigation measures. This Action plan provides an opportunity for an additional intervention measure that entails the introduction of e-mobility as part of a holistic solution to climate change.

1.2 The Governance structure of the City County of Nairobi

Nairobi is the capital of Kenya and also one of the 47 counties established by the Constitution of 2010. It is also the largest City in Kenya covering an area of 696.1 Km2. The City County that lies some 480 Kilometers northwest of Mombasa at 1680 metres above sea level was founded in 1895 first as a colonial railway settlement, then subsequently as the administrative capital of the colonial government of Kenya. (State Department of Devolution, n.d.)

The County is a strategic transport and communication hub in the region and hosts one of the busiest airports in Africa, the Jomo Kenyatta International Airport. It is one of the most important economic centers in East and Central African Regions. As at 2014, Nairobi accounted for 50% of formal employment in Kenya at the same time contributing approximately 50% of the GDP. Consequently, Nairobi occupies a key role in the political and economic development of the republic of Kenya. (Nairobi City County, 2023)

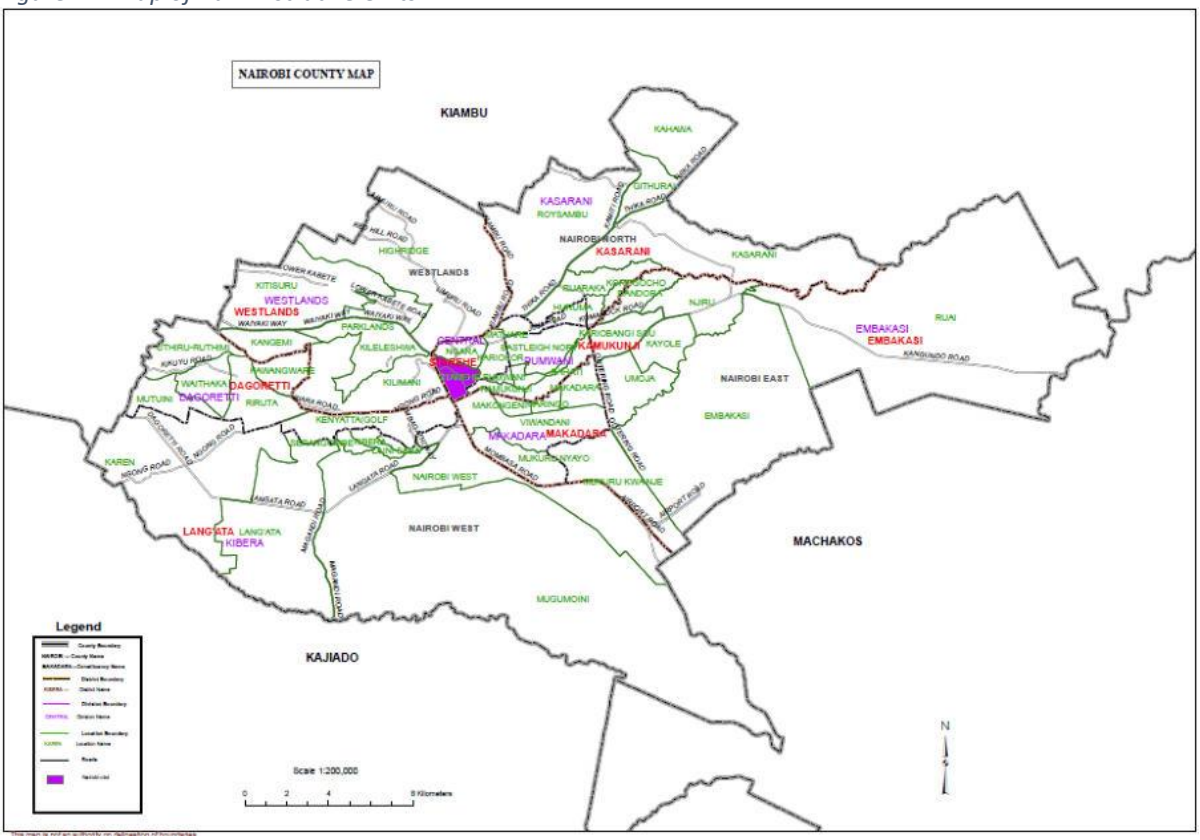
Nairobi is one of the most important diplomatic hubs in Africa. It hosts several embassies and international organizations. It is the United Nations Headquarters in Africa hosting both the United Nations Environment Programme (UNEP) and the United Nations Human Settlement Programme (UN-Habitat). It is also the Regional Headquarters for a number of multinational companies and Non-Governmental Organizations. The City County also hosts the Office of the President of Kenya, Parliament, and the Supreme Court of Kenya. It is the seat of the Government and the principal industrial center in Kenya.

The Governance of Nairobi City County.

The City County of Nairobi was created by the Constitution of Kenya 2010. It is one of the two city counties in Kenya alongside Mombasa City County. The City County of Nairobi is the successor of the defunct City Council of Nairobi. Its unique nature qualifies it to operate both within the provisions of the County Government Act and the Urban Areas and Cities Act.

The County Government of Nairobi consists of two arms: The County Assembly and the County Executive. The County Assembly exercises the representative, legislative and oversight authority of the county government, while the Executive exercises the executive authority.

Figure 1-i: Map of Administrative Units



Source: Nairobi County Integrated Development Plan 2023-2027

Table 1-a: County Government Administrative Wards.

Sub-County	No of Wards
Westlands	5
Dagoretti North	5
Dagoretti South	5
Lang'ata	5
Kibra	5
Kamukunji	5
Kasarani	5
Roysambu	5

Ruaraka	5
Mathare	6
Starehe	6
Embakasi Central	6
Embakasi North	5
Embakasi South	5
Embakasi East	5
Embakasi West	5
Makadara	4

Source: County Government of Nairobi. (CIDP)

Table 1-b: National Government Administrative Units, Nairobi

Sub-county	No of Divisions	No of Locations	No of Sub-locations	Area (Km^2)
Dagoretti	3	7	17	29
Embakasi	3	7	14	86
Kamukunji	2	7	9	11
Kasarani	3	11	23	86
Kibra	3	4	10	12
Lang'ata	2	4	10	217
Makadara	3	5	10	12
Mathare	3	5	5	3
Njiru	3	9	13	130
Starehe	3	7	10	21
Westlands.	3	6	15	98

Source KNBS.

Demographic Features of Nairobi City County.

Although the third smallest county in Kenya with an area of 696.1 km2, Nairobi is by far the most populous county with an estimated population of 4,397,073 people according to the 2019 census. Of this population, 2,192,452(49.9%) were male, while the females accounted for 2,204, 376 people (50.1%) In all the county had a total of 1,506, 888 households with an average household size of 2.9 people. (CIDP) 2023-28.

Nairobi City County Organogram

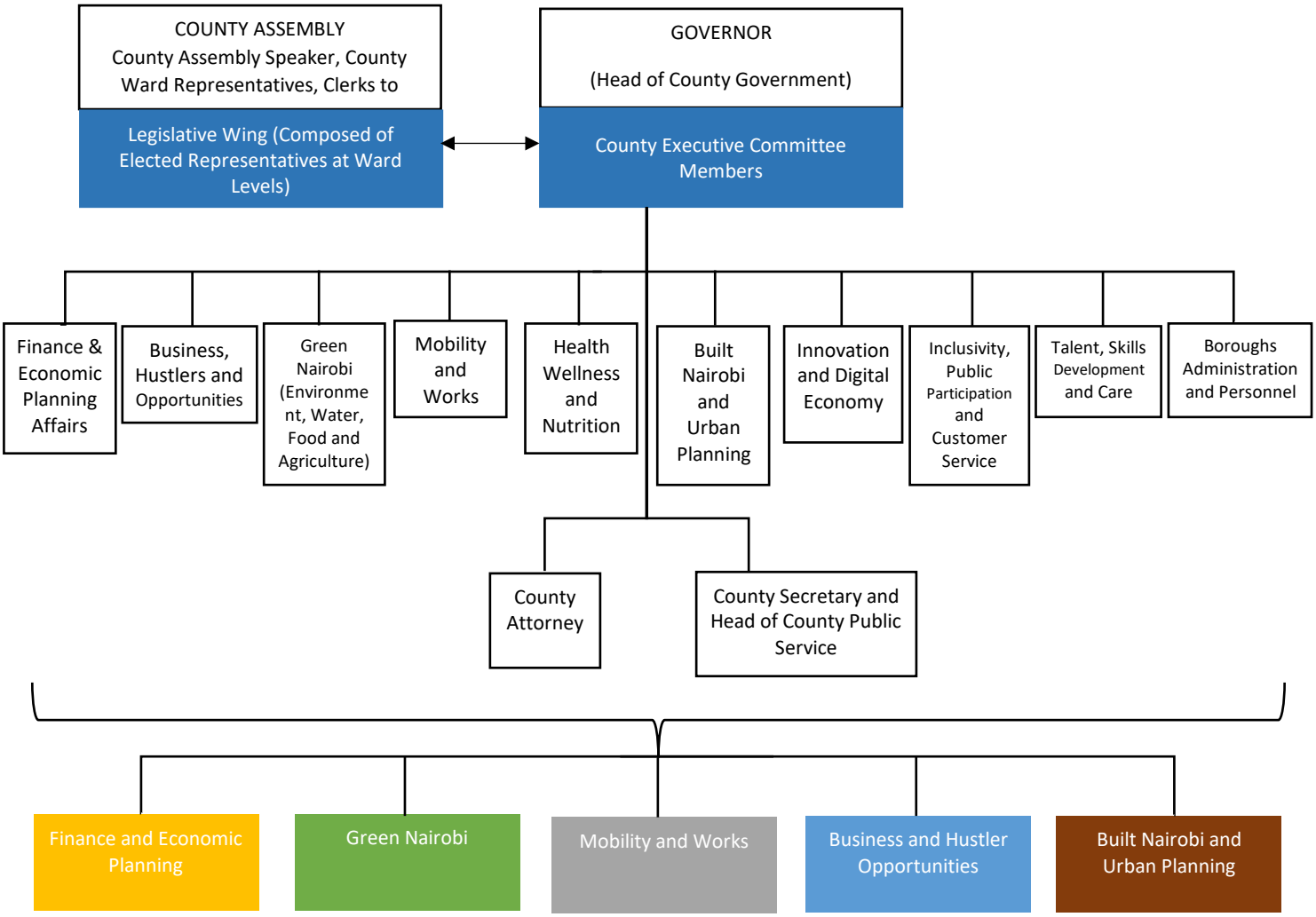


Table 1-c: Detailed functions of E-Mobility Relevant Departments

Mobility and Works	Business and Hustler Opportunities	Green Nairobi (Environment, Water, Food and Agriculture)	Built Environment and Urban Planning Sector	Finance and Economic Planning Affairs
Mobility sub sector Functions ▪ To design and operate traffic management system (TMS) to enhance efficient flow of both vehicles and pedestrians ▪ To coordinate stakeholders in the public transport sector ▪ Liaison with National and other agencies in the planning and designing of transport systems within the county ▪ To maintain county fleet machinery and plant to facilitate service delivery; **Works sub sector Functions** ▪ Design, develop and maintain roads to standard that will enhance efficient transportation of people goods and services; ▪ To develop and maintain public transport infrastructure; ▪ To design, develop and maintain institutional facilities to enhance service delivery; ▪ To coordinate energy and lighting infrastructure in the County	**Business and Hustler Opportunities Sub sector Functions** ▪ Promote, coordinate and implement integrated socio-economic policies and programmes for a rapidly industrializing economy ▪ Promote Micro, Small and Medium Enterprises (MSMEs) ▪ Provide business counselling, advisory and consultancy services. ▪ Provide capacity building programmes to indigenous MSMEs. ▪ Manage a credit scheme that offers financial assistance to indigenous MSMES. ▪ Hold interactive forms with indigenous MSMEs. ▪ Provide information on trade related matters to MSMEs. **Markets and Trade Sub sector Functions** ▪ Ensure fair trading practices within the County ▪ Promote trade development ▪ Trade development and Regulation ▪ Markets Infrastructure Development ▪ Promote Industrialization ▪ Regulate and control business permits ▪ Promotion of organized trading centers ▪ Collaborate with relevant institutions on Trade matters **Cooperatives Sub Sector Functions** ▪ Carrying out certification of co-operatives societies audit	**Environment Sub Sector Functions** ▪ Control of Air pollution, noise pollution and other public nuisances ▪ Electricity and gas reticulation and energy regulation ▪ Climate Change **Food Agriculture and Natural Resources Sub Sector Functions** **Water and Sewerage Sub sector Functions**	**Lands Sub Sector Functions** ▪ County land and infrastructure surveying ▪ GIS and mapping ▪ County valuation services ▪ Land administration and property management ▪ Land registration **Urban Development and Planning sub sector Functions** ▪ County urban development planning and Urban design ▪ County urban development control ▪ County urban development research and statistics ▪ Planning Compliance and Enforcement ▪ Urban Policy and Research **Housing and Urban Renewal sub sector Functions** ▪ Housing development. ▪ Estates Management ▪ Building design and implementation services ▪ Urban Renewal	**Finance Sub sector functions: –** ▪ Developing and implementing financial and economic policies in the County. ▪ To ensure prudent financial management including financial reporting and enforcement of the fiscal responsibility principles. ▪ Management of County assets ▪ Ensuring proper accounts and other records in respect of the County government and its entities to promote efficient and effective use of the county's budgetary resources ▪ Providing the national Treasury with information it may require to perform its functions under the constitution. ▪ Advising the County government entities, the county executive committee and the county assembly. ▪ Strengthening financial and fiscal relations between the national government and county governments in performing their functions. ▪ Ensuring equitable regional development of the county through implementation of ward development **Economic Planning Sub Sector Functions: –** ▪ Preparing the annual budget for the county and coordinating the preparation of estimates of revenue and expenditure of the county government. ▪ Coordinating development planning and implementation ▪ Management of County statistics ▪ Consolidating the annual appropriations accounts and other financial statements of the county in a format determined by the Accounting Standards Board. ▪ Monitoring the County government entities to ensure compliance to plans, budgets, policies and the PFMA. ▪ Strengthening financial and fiscal relations between the national government and county governments in performing their functions. ▪ Reporting regularly to the county assembly on the implementation of the annual budgets ▪ Strengthen policy formulation, planning, budgeting and management of county statistics. Also enhancing tracking of implementation of development policies, strategies and program

1.3 E-Mobility Landscape in Nairobi

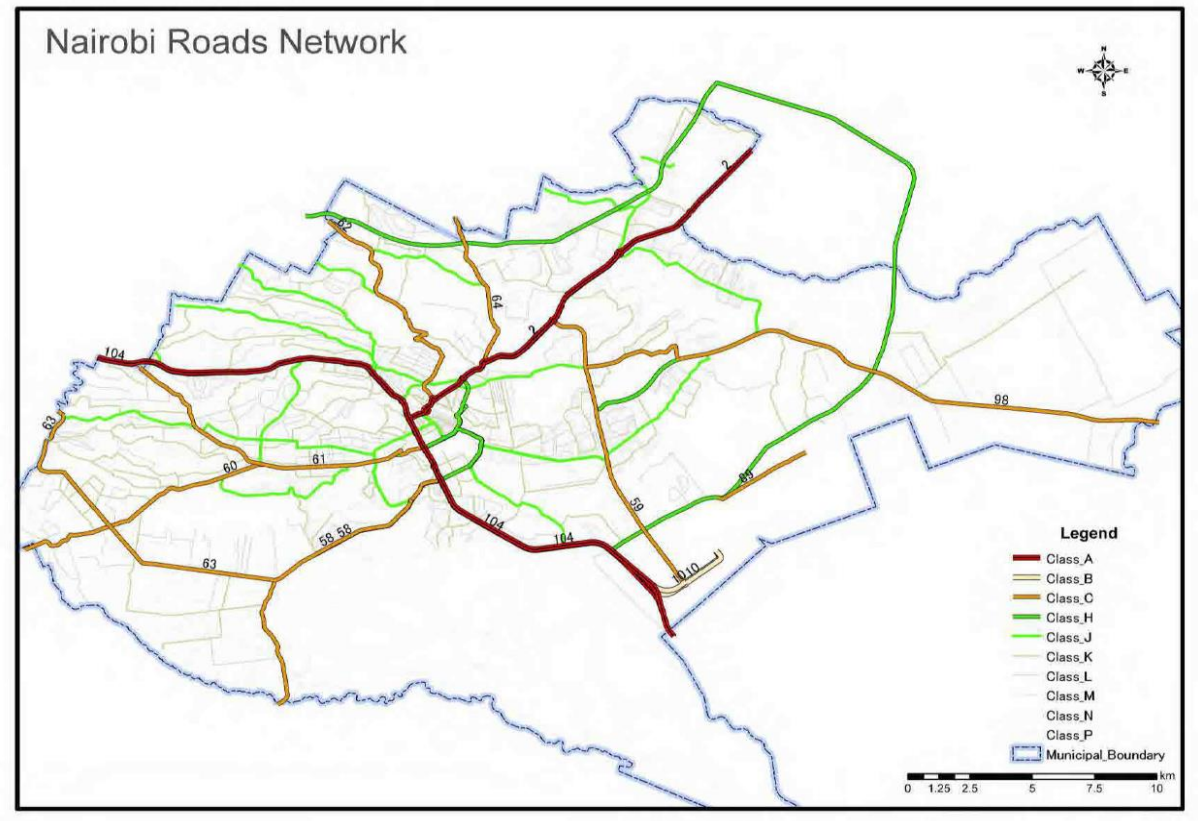
A situation analysis of the current e-mobility landscape in the city of Nairobi reveals a very complex transport milieu.

i. Road infrastructure.

Roads and streets in the city of Nairobi are generally designed to take ordinary traffic. Over the years, the supply has always fallen behind demand as the population grows rapidly and traffic increases. Road widths have been rather constrained as a consequence occasioning traffic snarls up. This situation has been exacerbated by the lack of technological applications in the management of traffic.

The city of Nairobi roads network is not designed for mass transportation purposes and is therefore inefficient and not easily adaptable to e-buses. While it is essential to adapt existing road infrastructure in Nairobi to accommodate EVs as well as charging infrastructure and charging stations in particular, policies and design protocols will need to be re-configured. At the moment, no charging stations are located on the road corridors and no provision is made for them in road design.

Figure 1-ii: Road Network in Nairobi City



Source: JICA Study Team

Table 1-d: Classified Roads in Nairobi City and Their Functions

Road Number	Name	Function	Coverage Area
B10	Airport North Road	Principal Arterial	Airport North
C58	Magadi Road Minor	Arterial	Langata, Kajiado

C59	Outer Ring Road	Principal Arterial	Embakasi, Makadara, Kamukunji, and Kasarani
C60	Ngong Road	Principal Arterial	Dagoretti, Langata to Kajiado
C61	Naivasha Road	Minor Arterial	Dagoretti to Langata (partly missing)
C62	Limuru Road	Principal Arterial	Westlands
C63	Langata Road, Dagoretti Road, Kiambu Road and Ruiru Road	Principal Arterial	Langata, Kajiado, Kiambu
C64	Kiambu Road	Minor Arterial	Kasarani, Westlands
C98	Komarock Road	Principal Arterial	Embakasi, Kjiru, Kathiani
H6	Eastern Bypass	Principal Arterial	Embakasi, Njiru
H7	Northern Bypass	Principal Arterial	Kiambu, Kasarani, Westlands

Source: JICA Study Team, Road functions are based on The Study on Master Plan for Urban Transport in the

ii. Electric Vehicle Landscape.

Kenya's transport landscape is changing with the advent of climate change concerns and the high cost of fuel and maintenance of Internal Combustion Engine (ICE) vehicles. The Electric Vehicle market is growing with Nairobi City exhibiting quite a significant percentage of this growth. There has been a considerable increase in the registration of EVs in Kenya between 2018 and 2023 as indicated in the table below.

Table 1-e: New Electric Vehicle registration by vehicle classification (2018-2023)

Type of EV	2018	2019	2020	2021	2022	2023
Electric Bicycles					321	1,353
Electric Motorcycles	44	96	28	144	366	2,557
Electric Tuk- Tuks		4	21	35	40	39
Electric Passenger Cars	12	15	31	62	36	45
Electric Buses & Mini Buses					3	18
Electric other Vehicles	9	13	24	43	30	35
Total EVs registered	65	129	104	284	796	4,047

Source: NTSA.

These are national statistics that have not been disaggregated to provide for the city-county of Nairobi. Of the total number of vehicles annually registered in Kenya across the technologies (ICE and EVs), the bulk are domiciled in Nairobi. The table also indicates the range of Electric vehicles currently found in Kenya. In 2021 the market survey prepared by AEDMA indicated there were at least 18 electric mobility companies operating in Kenya, most of them under the two and three-wheeler segment.

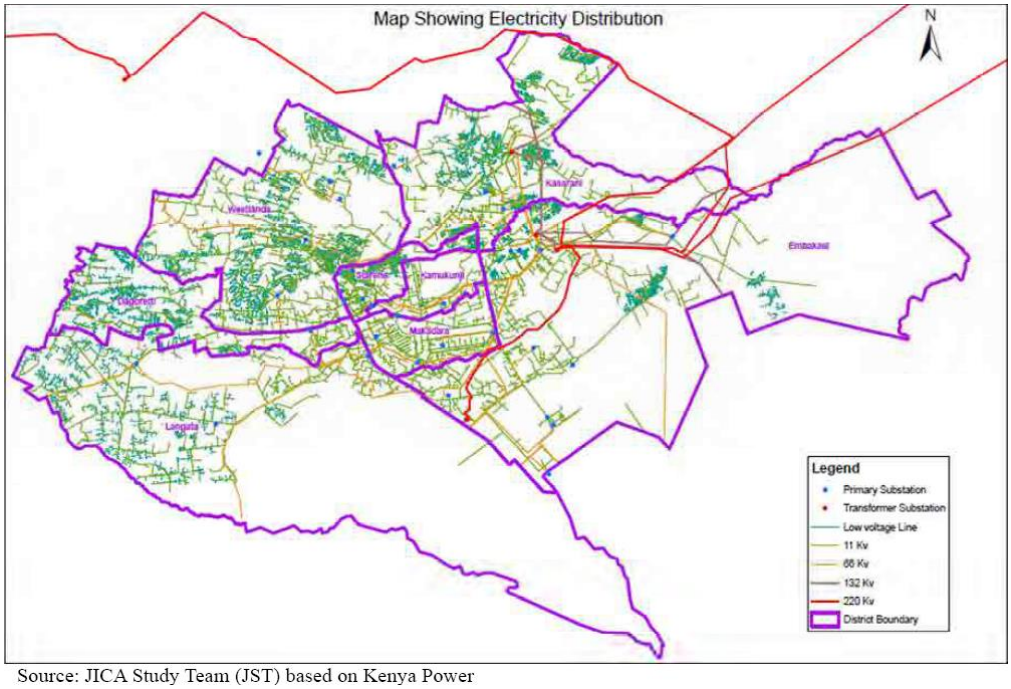
The National Energy Efficiency and Conservation Strategy (2020) aims to attain a 5% EV target of all newly registered vehicles in Kenya by 2025. All the fiscal and non-fiscal incentives are geared towards making this target feasible.

iii. Charging Infrastructure

Charging infrastructure is one of the most critical aspects of e-mobility. Among industry stakeholders, there is a strong view that this aspect is grossly underdeveloped. Charging and battery swapping stations are not well distributed not just in Nairobi but in the whole country. This however can be rightly attributed to the transitional place e-mobility currently occupies in the transport sector.

In a relatively more developed e-mobility economy, the distribution of charging as well as battery swapping stations will be more evenly to match supply and demand dynamics in the market. Stations would generally have been distributed to cover a wide range of options including; roads and buildings appropriate for the purpose, provisions in town planning regulations for home charging, office parks and public areas.

Nonetheless, charging as well as swapping stations have been developed informally in keeping with market trends in the emerging e-mobility sector. Some e-motorcycle companies have made significant investment decisions in developing battery swapping stations in Nairobi. One such example is that of the ARC Ride Company which has deployed76 stations in Eastlands, Westlands, Gitari, Kiambu Road, and Kabete as well as on the Thika Highway and Mombasa Road. Total Energies is amongst the firms that have taken the initiative to co-locate charging facilities within their existing fuel outlets at various locations in Nairobi. Charging stations are currently located at the Waterfront Mall, the Hub in Karen, Thika Road Mall, and the Parking Silo at the Holy Family Basilica in the CBD. Other Charging stations have been established at the Jomo Kenyatta International Airport, the ABC Mall as well as at the United Nations Complex at Gigiri.



Source: JICA Study Team (JST) based on Kenya Power

Figure 1-iii: GIS Data of Kenya Power

Table 1-f: Power Demand and Supply in Nairobi Region

Nairobi Region	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Number of Customers	445,595	505,414	595,010	669,128	814,251	921,548
Total Sales (GWh)	2,595	2,782	2,950	3,071	3,332	3,290
Maximum Demand (MW)	522	548	568	588	623	662

iv. Market characteristics/ sector players.

The e-mobility landscape might be relatively new but boasts an incredibly impressive range of players. The players range from industrialists involved in manufacturing and assembling, to vendors and service providers across the e-mobility value –chain. The sector has witnessed phenomenal growth over the last five years with the impetus coming from the private sector. Table 1-g indicates the range of players across the value chain.

Table 1-g: Range of Players Across the Value Chain
(AHK Delegation of German Industry and Commerce for Eastern Africa., 2023)

	Sector player	Assembling	Infrastructure development	Mass adopters	Financiers	Research
1	Kiri EV	■				
2	Fika Clean Mobility	■				
3	Opibus	■	■	■		
4	Mazi Mobility	■				
5	Arc Ride	■				
6	Eco-Boda	■				
7	Solar e-Cycles	■				
8	Drive Electric	■	■			
9	KenGen		■			
10	Knights Energy		■			
11	KPLC		■			
12	Uber			■		
13	Nopea Ride			■		
14	Bolt			■		
15	Jumia			■		
16	Get Boda			■		
17	P4G			■	■	
18	GIZ			■		■
19	EBee			■		
20	Maris				■	
21	WaTu				■	
22	Mogo Kenya				■	
23	SIEMENS Stiftung				■	

There also are other corporate umbrella associations which are involved in the e-mobility sector. They include; Advocacy groups such as the Electric Mobility Association of Kenya(EMAK), Kenya Association of Manufacturers, (KAM), Africa E-Mobility Alliance (AfEMA) and the International Chamber of Commerce.

Development partners and donor organizations have a very robust presence on the e-mobility landscape in Kenya based mainly in the City County of Nairobi. The United Nations Environment Programme-UNEP has been providing the Technical Assistance required to shore up the transition to e-mobility in Kenya. Others include the Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ), World Resources Institute (WRI), USAID, Foreign Commonwealth and Development Office (FCDO) and the International Finance Corporation.

Finance companies have been indispensable in providing the resources needed in the market to invest in motorcycles and e-buses. Without the credit facilities offered by them, most of the E-Vehicles dotting the Nairobi landscape would not have been feasible at all. Among the key players are; The Kenya Commercial Bank (KCB), NCBA, M-Kopa, Equity Bank, SACCOs, as well as microfinance institutions. On the Academic front, Strathmore University has been instrumental in shaping the direction in the quest to advance e-mobility technologies and business strategies.

v. Policy and regulatory framework.

In the absence of national level policies and Regulatory frameworks for the promotion of e-mobility, the city-county of Nairobi is highly unlikely to have the preparedness envisaged for e-mobility transition. While the major impetus for the e-mobility transition will come from fiscal as well as energy regulatory policies that are formulated at the national level, it would appear that most of the current efforts are taking place in a policy lacuna. Moreover, most of the national policies around e-mobility have been tailored to regularize activities that are currently underway albeit in all manner of informal ways. The Climate Change Act, of 2016, the National Climate Change Action Plan (2018-2022, The Finance Act Amendment of 2019 and the Draft Electric Mobility Policy 2024 are all proactive measures on the part of the National government to facilitate e-mobility transition in Kenya and by inclusion, Nairobi City County. It is prudent to observe that e-mobility activities will require much more in terms of policy re-engineering at the City-County level for a much smoother transition.

1.4 Policy Framework and E-Mobility Market Readiness.

E-mobility integration into the mainstream transportation sector in Kenya is a complex process involving a huge number of stakeholders and actors. The range of activities that constitute the key elements of this transition reflect a whole range of policy considerations that must be taken into account. These policy measures determine the extent of market preparedness for the transition to e-mobility in the City-County of Nairobi.

Following the enactment of the Climate Change Act 2016, several other policy instruments have followed rapidly as part of a raft of government measures to meet the National Determined Contributions. Consequently, the National Climate Change Action Plan (2018-2022) was completed providing action points necessary for the deployment of e-mobility in Kenya among other strategies. The Finance Act of 2019 on its part included a clause for the reduction of import duty on Electric Vehicles from 20% to 10% to encourage uptake.

While revisions are being made to the Integrated National Transport Policy to include provisions for Electric Vehicles as well as the larger question of electric mobility in terms of related infrastructure, a fully-fledged National Electric Mobility Policy has been completed in 2024 in draft awaiting approval.

The Vision of the Draft Electric Mobility Policy of Kenya is to Position Kenya as a leader in electric mobility transition in Africa while its Mission is to Create a Pathway towards a more sustainable,

efficient, and equitable transportation powered by e-mobility. The Key objectives of the electric mobility policy are:

- Develop an integrated and comprehensive policy, legal, regulatory and institutional framework to promote adoption of e-mobility.
- Promote Local Manufacturing and Assembly of Electric Vehicles (EVs).
- Develop and enhance e-mobility infrastructural capacity to accelerate adoption of EVs.
- Enhance local technical capacity and skills across the e-mobility Value Chain.
- Improve fiscal and non-fiscal measures to accelerate the adoption of EVs.
- Scale up socioeconomic measures to promote the adoption of EVs.
- Reduce over-reliance on Road Maintenance Levy (RML) collected on petrol and diesel.

E-mobility is largely being implemented against a background of traditional approaches to transport planning, feasibility, design, construction and operation. The policy regime therefore remains largely unresponsive to both the demands for climate-resilient transport infrastructure and e-mobility. Therefore, Kenya finds itself at a time when it has to carry out massive policy re-engineering to respond effectively to the changes in transport occasioned by the exigencies of climate change.

Table 1-h: Summary of Current E-mobility Preparedness

Current Policy Framework	
Market readiness	Electric Mobility Association of Kenya. (2024) Electrifying Kenya's Transportation Sector. EPRA& UNES (2024) Market Assessment of Electric Mobility in Kenya.
E-mobility policy support	Electric Mobility Taskforce, Kenya (2024). Draft National E-Mobility Policy. Kenya. UNEP&FIA foundation. (2023) Electric Mobility Strategy for Kenya. UNEP. (2022). Electric Mobility Toolkit to Support Kenya Government in its Electric Mobility Transition. AHK Delegation of German Industry and Commerce for Eastern Africa. (2023) Roadmap to e-Mobility in Kenya.
Standards/Regulations	Energy and Petroleum Regulatory Authority (EPRA. (2023). Electric Vehicle(EV)Charging and Battery Swapping Infrastructure Guidelines.
Opportunities for E-mobility	Nairobi City County: Climate Change Action Plan 2020-2050. Adequate electricity supply and reticulation in Nairobi County. A tech savvy middle class. Nairobi City County Transport Act 2020. (Part VII –low emission zone)
Barriers to E-mobility.	Lack of appropriate policies at ccounty level. Lack of appropriate city level plans. Lack of appropriate Standards and regulations. Lack of appropriate skills and competencies at the city county level. Lack of disaggregated data on motor vehicle sales and registration for the City County.

2 Methodology

Due to time constraints, this roadmap was developed primarily by way of a desktop literature review and very limited interviews with stakeholders**.** An in-depth literature review of documents and

policies related to e-mobility and climate change was carried out to establish the situation currently prevailing in Nairobi in the first instance, and to gather information on e-mobility trends at the national level. The key documents reviewed include the Draft E-Mobility National Policy 2024; the City Roadmap for E-mobility for Kathmandu; Nepal, the Nairobi City County Climate Change Action Plan 2020-2050; Market Assessment of Electric Mobility in Kenya; Electrifying Kenya's Transportation Sector; Electric Vehicle charging and battery swapping infrastructure guidelines by EPRA; Electrifying Kenya's Transportation Sector; E-Mobility Toolkit; and the Roadmap to E-Mobility in Kenya.

3 Roadmap

The overall purpose of the roadmap is to facilitate a clear transition to e-mobility in Nairobi by way of providing;

- Coordination and collaboration amongst a plethora of stakeholders in a structured manner.
- Enabling stakeholders to work within a clear vision of e-mobility in Nairobi.
- Facilitate the planning necessary for successful introduction of e-mobility in the City County of Nairobi.
- Allow for an opportunity to review policies and regulations necessary for e-mobility transition in the City County of Nairobi.
- The participation of the public as provided for in the Constitution of Kenya 2010.

3.1 Vision

Nairobi's E-mobility vision is closely tied to its Climate Vision. The Action Plan prioritizes low-carbon solutions and climate-proofing transport infrastructure but stops short of expressly providing for e-mobility interventions. Action 5 of the Nairobi Climate Action Plan however prescribes an increase in adoption of renewable energy in furtherance of the National Climate Change Action Plan.

The e-mobility vision for the city-county of Nairobi sets out:

- To provide clear steps for successful transitioning of the city-county towards sustainable and clean transportation in keeping with Kenya's E-Mobility policy and National Climate Change Action Plan on the one hand and the Nairobi City County Climate Action Plan on the other.
- Steps for establishing Infrastructure required for e-mobility transitioning in Nairobi City County.
- To provide the policy framework necessary for transitioning Nairobi to e-mobility.
- To position the City County of Nairobi as a leader in the electric mobility transition in Africa.
- To position e-Mobility in Nairobi as a vehicle for;
- Reduction of GHG emissions in Nairobi.
    a. Strategy to reduce GHG emissions (67% CO2), 11% GHG) directly attributed to the transport sector in Kenya to which Nairobi is the principal contributor
    b. To reduce Nairobi's overall contribution to Co2 and GHG emissions in Kenya to zero by 2050.

3.2 Objectives

The following are the key objectives of the e-mobility roadmap for the City County of Nairobi:

a. Carry out a comprehensive analysis of the current state of e-mobility in the City County of Nairobi.

b. Develop an outline e-mobility strategy based on current policy, infrastructure, institutional as well as market constraints.
c. Mobilize the partnerships and collaborations necessary for the successful transition of e-mobility into the City County of Nairobi.

3.3 Timeframe

This roadmap envisions an implementation programme for e-mobility in Nairobi covering the short, medium and long-term horizons. In the absence of pre-determined pilot projects, aspects that require short-term interventions such as policies, regulations as well as urban planning shall be given priority at both the national and county government levels. Other activities that must be carried out in the short term include; awareness creation and campaigns about the potential environmental benefits of e-mobility, tax exemptions, and City County level consultations amongst key stakeholders. These are activities that need to be implemented during the current fiscal programmes of the National and County Governments.

Scheduling of medium and long-term activities (2030-2050) will require a much more intentional and comprehensive stakeholder consultation process to determine the order of priorities. However, it is prudent to assume that medium and long-term e-mobility rollout will be an incremental process taking into account, market dynamics, infrastructure investments, manufacturing, and capacity building amongst other things.

4 Implementation Plan

4.1 Institutional Arrangements for e-mobility transition

The Constitution of Kenya 2010 created two levels of government. These consist of the National Government on one hand and County Governments on the other. National government mandates are mostly centered around policy formulation, principles and standards. The mandates of the counties are provided for in Schedule 4 of the constitution. They are mostly about policy implementation and provision of last mile services to residents.

Transition to e-mobility is a relatively novel idea in Kenya. It is for this reason that the National Government has embarked upon the preparation of a national e-mobility policy to guide efforts in the sub-sector. Several policy positions have also been articulated by Development Partners as well as business fraternities in the transport sector in Kenya. It is therefore important to underscore the need for a coordinated approach between the National and County Governments on one hand and development partners and the business community on the other to be able to successfully transition e-mobility activities in Nairobi City County.

1) Role of the National Government.

Table 4-a: National Government Ministries related to E-mobility

Ministry or Agency	Role in e-mobility.
Energy and Petroleum Regulatory Authority. (EPRA)	Provide EV Charging and Battery Swapping Infrastructure Guidelines
Kenya Urban Roads Authority (KURA)	In charge of management, development, rehabilitation and maintenance of roads in cities and municipalities in Kenya.

	Controlling urban road reserves and access to roadside developments.
Energy Regulation Commission	Regulate production, distribution, supply and use of renewable energy used in battery charging
Kenya Power and Lighting Company (KPLC) Ltd	Providing connectivity , distribution and availability of electricity required for EV purposes.
Kenya Industrial Research and Development Institute. (KIRDI)	To promote industrialization in Kenya by way of research.
Micro and Small Enterprises Authority (MSEA)	To coordinate and harmonize all activities for MSE development.
Kenya Industrial Estates (KIE)	Development of Industrial Estates. Enable start-ups in e-mobility assembly etc.
Kenya Investment Authority (KenInvest)	missing

2) **The City County of Nairobi.**

Table 4-b: City County of Nairobi's Potential Role in e-mobility transition

	Nairobi County Department.	Potential Role in e-mobility transition.
1	**Business and Hustler opportunities**	Support Small and Medium Enterprises, particularly start ups in the EV sector.
2	**Green Nairobi , Environment, Water Food and Agriculture (Energy)**	Facilitate adequate distribution of energy required for EV activities such as charging stations.
3	**Finance and Economic Planning Affairs.**	Disbursement of funds to departments necessary for e-mobility transition.
4	**Mobility and Works**	Providing appropriate infrastructure and regulations for successful e-mobility transition in Nairobi City County.
5	**Built Environment and Urban Planning Sector.**	Facilitate plans and regulations necessary for e-mobility transition in Nairobi City County.
6	**County Assembly of Nairobi.**	Legislation and Policy.

3) **Development Partners and UN Agencies.**
The key partners supporting e-mobility in Kenya are; United Nations Environment Programme (UNEP), United Nations Center for Human Settlements (UN-Habitat) and the World Bank.

4) **The Private Sector in Kenya.**
Private Sector engagement is served by way of umbrella organizations such as; Kenya Association of Manufacturers, (KAM), Kenya Private Sector Alliance (KEPSA)
Nairobi County Business Association (NCBA), E-Mobility Association of Kenya.

4.2 Focus Area 1: Urban Planning

- Preparation of a new master plan to decentralize services away from the Central Business District(CBD). The Nairobi Masterplan-2014-2030 (NIUPLAN) elaborates on this aspect.
- An urban planning vision for Nairobi City County with a focus on a green, efficient and inclusive City.
- Planning of Nairobi to give priority to Mass Rapid Transit as well as Non-Motorized Transport modes.
- Planning to include revision of building codes for enhanced energy efficiency in Nairobi City County. This will entail the Green Certification of Buildings.
- Urban planning to ensure building codes and regulations accommodate Electric Vehicle charging infrastructure.
- Access and right of way are critical aspects that need to be factored in new policies and practices when planning for EV charging infrastructure.
- Planning regulations required for setting up public charging stations.
- New comprehensive guidelines are required for the location of public EV charging stations complete with specific regard to distance, and population density among other parameters for application in Nairobi City County.

- Public land to be provided at subsidized rates to facilitate the construction of charging and battery swapping stations in City County of Nairobi (CCN) by private sector players.
- Encourage charging infrastructure for 2/3 wheelers and buses within low-income settlements.
- Planning for exclusive low carbon emission zones for restricted use by Electric EVs to help promote e-mobility adoption in City County of Nairobi.

4.3 Focus Area 2: Regulatory Measures

- Review parking regulations to provide room to install EV charging points on streets of Nairobi where technically feasible.
- Review road design manuals to include charging points along road corridors in keeping with global best practices.
- Develop regulations to permit private charging at offices and residential areas in Nairobi.
- Develop regulations for public charging stations. (Some of these are already prepared and need to be disseminated amongst stakeholders)
- Regularize all petrol stations to co-locate charging and swapping stations within existing facilities.
- Review and implement new electricity tariffs favourable for electric vehicle charging stations.
- Develop policy and regulatory framework for monitoring importation of used Electric Vehicles.
- Establish minimum environmental and safety standards to qualify used vehicles for local use in Kenya and the City County of Nairobi in particular.

4.4 Focus Area 3: Economic and Financial Measures

- Increase investments in electric buses for Mass Rapid Transit (MRT) in the City County of Nairobi.
- Encourage business entities to set up Public Charging Stations (PCS) that are in keeping with minimum technical standards and regulations.
- Develop incubation centres for start-ups in the EV value –chain in the City County of Nairobi.
- Lobby for the establishment of a Nairobi branch of the Electric Mobility Association of Kenya (EMAK) to help mobilize and harmonize the EV business community in Nairobi City County.
- Encourage commercial banks to build capacity in e-mobility finance to support the many fledgling e-mobility business efforts across the value chain in Nairobi.
- Promote local manufacturing and assembly of electric vehicles in the City County of Nairobi.
- Put in place measures for manufacturing EV parts, batteries and related accessories in the City County of Nairobi.
- Support local battery manufacturing, recycling and repurposing in City County of Nairobi.
- Develop programmes to employ women, youth and Persons with disabilities in different e-mobility-enabled economic activities across the value-chain.
- Provide appropriate e-financing packages and products to support women, youths and people with disabilities.
- Provide fiscal and non-fiscal incentives to Electric Vehicle consumers to accelerate EV adoption.
- Provide incentives for businesses and property owners to install public EV charging infrastructure.
- Provide unique license plates for Electric Vehicles (EVs) to allow access to specially designated e-mobility promotion zones with subsidized parking fees in all sub-counties in Nairobi City County.
- Reduce stamp duty charges on EV infrastructure development.

- Provide incentives to grant subsidies to public transport service players acquiring high-capacity EV buses/ vehicles for urban commuter purposes.

4.5 Focus Area 4: Transport and Charging Infrastructure.

- Roll out a programme to retrofit the Nairobi County Government fleet of vehicles from ICE to EV to demonstrate commitment to transition to e-mobility by 2030 and towards a zero-emission city by 2050 status for Nairobi.
- Develop and enhance e-mobility infrastructure capacity to accelerate adoption of e-mobility in Nairobi City county.
- Integrate charging infrastructure with energy and transport planning.
- Establish supportive measures for EV charging infrastructure in Nairobi.
- Ensure supply of renewable energy for EVs for public charging stations via solar rooftops at parking stations.
- Adopt electric-based mass transportation systems in the city-county of Nairobi
- Deploy in phases charging infrastructure / public charging stations in all sub-counties of the City County of Nairobi.
- Increase deployment of battery swapping stations in the sub-counties of City County of Nairobi.
- Promote the integration of electric vehicle-based transport systems in infrastructure design policies in the City-County of Nairobi.
- Develop policy frameworks for the transition of public transport from ICE to EV in a phased approach
- Set out quotas and targets to increase the share of electric Public transport vehicles of the total number currently operating in Nairobi's transport economy.
- Improve the design of public transport facilities to incorporate the needs of women.
- Ensure that the charging network in the City County of Nairobi meets gender-friendly requirements.

4.6 Focus Area 5: Partnerships and Public Awareness.

- Mainstream Gender equity into transport –electric mobility programmes currently taking place in the City County of Nairobi.
- The City County to ensure deployment of security personnel to the public transport sector in Nairobi.
- Both the National and County governments to guarantee programmes for employment of women in e-enabled transport activities in the City County of Nairobi.
- Develop public-private partnerships with KPLC and power generators for fleet financing and charging infrastructure.
- Through Public-private partnership, enhance local technical skills capacity building across the e-mobility value chain.
- Build local capacity for EV operation repair and maintenance in Nairobi City County.

5 Conclusions and Next Steps

The roadmap to e-Mobility in the City County of Nairobi sets out to provide an explicit Action plan to facilitate smooth e-mobility transitioning in the county. It simplifies a complex process to a level that can be understood by the majority of stakeholders in Nairobi.
The roadmap describes the current state of e-mobility in Nairobi in the context of Kenya's overall e-mobility transition arrangements as provided explicitly in the draft National E-mobility Policy. The policy aims to position Kenya as a frontrunner in efforts to entrench sustainable mobility strategies to help reduce GHG emissions in Nairobi to zero by 2050.
The roadmap allows various stakeholders including the general public to appreciate the context in which e-transition should be conceptualised and implemented in the City County of Nairobi. By defining the present e-mobility landscape, the roadmap strives to paint a clear picture of the situation prevailing in Nairobi and its environs. It attempts to profile the range of Electric Vehicles in the market and key actors in the sector while auditing the state of infrastructure for charging and battery swapping.
The roadmap describes the existing policy environment in which e-mobility is being implemented. It highlights the key challenges that have to be addressed across different sectors from energy, transport, finance and urban planning. A lot of policy re-engineering will be required to keep up with the pace at which the e-mobility sector is emerging in Kenya.
The roadmap also indicates the direction and destination of the e-mobility initiative in Nairobi. In rendering the vision and objectives, it provides steps for transitioning the city-county towards sustainable and clean transportation. This is in keeping with Kenya's draft National E-Mobility policy and both the National and the Nairobi City County Climate Action Plans.

It also provides steps for establishing the Infrastructure required for e-mobility transitioning in Nairobi City County, the policy framework necessary for transitioning Nairobi to e-mobility that will ultimately position the City County of Nairobi as a leader in the electric mobility transition in Africa. It seeks to install e-Mobility in Nairobi as a vehicle for reduction of GHG emissions in Nairobi as well as contribute to Kenya's targets as set out in the Nationally Determined Contribution (NDC) towards global efforts to stem climate change.

The City roadmap to E-Mobility transition in Nairobi needs deepening and enrichment. An upgrade is necessary to enable the principal stakeholders to have their say and to give it both ownership and legitimacy. With this outline roadmap, the upscaling of the process has been considerably simplified. In the absence of the principal stakeholders, many decisions required as input for this roadmap are missing.
There is a lack of coordination between the National and County government levels. The bulk of inputs at the moment relates mostly to policy and regulatory work that has been undertaken mainly by the National Government and the private sector supported by Development Partners. However, many of the efforts at the National government level, the draft E-Mobility Policy, for example, are work in progress and have yet to be approved by parliament. There is very little evidence of the cooperation that is required from the City County of Nairobi.

It is of utmost importance that this gap is bridged to allow the City County of Nairobi to take its strategic position in the process of transitioning to e-mobility in its area of jurisdiction. That the absence of the City County of Nairobi contributes to the massive gaps in the roadmap cannot be over-emphasized. As a direct consequence, the roadmap does not contain a whole range of

activities, projects and programmes necessary to make it complete. It lacks all the projects and programmes the City should have contributed to the pilot phase of the e-mobility transition.

An urgent review of the of E-Mobility transition process for the City County of Nairobi is highly desirable. The purpose of such a review would be to determine the key factors constraining the process and to find new ways and means of returning it to its right course. One way of achieving this objective is to improve this roadmap in such a manner as to use it as a catalyst to bring together all E-mobility stakeholders in Nairobi to strengthen it by identifying their role in the transition process.

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