

STATUS OF E-MOBILITY IN KENYA AND ELECTRIC VEHICLE (EV) CHARGING AND BATTERY SWAPPING INFRASTRUCTURE GUIDELINES, 2023

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PRESENTATION OUTLINE

- ❑ CONTEXT
- ❑ STATUS OF THE E-MOBILITY SECTOR
- ❑ KENYA'S ELECTRICITY SECTOR
- ❑ ROLE AND CAPACITY OF THE ENERGY SECTOR TO SUPPORT THE E-MOBILITY SECTOR
- ❑ FINANCIAL ANALYSIS & COST SAVINGS OF E-MOBILITY
- ❑ THE ELECTRIC VEHICLE (EV) CHARGING AND BATTERY SWAPPING INFRASTRUCTURE
GUIDELINES, 2023
- ❑ WAY FORWARD

CONTEXT

GLOBAL CONTEXT

In line with the Paris (COP21) climate goals - 22% of global vehicle sales could be electric by 2025 and 35% by 2030.

NATIONAL CONTEXT

Target – Achieve 5% vehicles registration being electric by 2025 (*National Energy Efficiency and Conservation Strategy, 2020*)

GOVERNMENT AGENDA

The Bottom-Up Economic Transformation Plan 2022-2027 (BETA) - Plan to construct 1,000 electric vehicle charging stations. 700 in urban areas and 300 along highways.

Available Support in E-mobility

EVs	Number
Motorcycles	844
Three-wheelers	153
Motor vehicles	186
Others	150
Total	1,350

- ✓ Reduction in excise duty from **20%** to **10%** for full EVs
- ✓ Approved EV tariff of **KShs 16/kWh** and **KShs 8/kWh** during peak and off-peak hours respectively
- ✓ **Taskforce** by Ministry of Roads and Transport on the Development of National Electric Mobility Policy, Strategy, Legislations and Regulations to promote growth and development of e-mobility in Kenya.
- ✓ Finance Act 2023 incentives:
 - Electric vehicle exemption from Value Added Tax (VAT)
 - Excise duty exemption for locally assembled motorcycles
 - Electric vehicle batteries exemption from both VAT and import duty, as well as Completely Knocked Down (CKD) and Semi Knocked Down (SKD) corporate tax reduction to 15%

Source : NTSA as at February 2023

Motor vehicles – (Saloons-5, Station Wagons-167, double cabins-3, vans-5, buses-3, lorries-3-

➤ **By end of 2022 -4.3 M Reg. Vehicles of which about 2 Million are 2/3 wheelers**

- ✓ UNEP and EPRA signed an Agreement in March 2023 whose aim was Promote the uptake of electric mobility in Kenya through identifying bottlenecks, proposing solutions to address them as well as ensuring sufficient e-mobility awareness nationally.
- ✓ The main activities shall be to conduct market assessment of electric two and three-wheelers identify barriers to uptake, and make recommendations on priority policy interventions to promote adoption of electric mobility in Kenya and to carry out public sensitization on electric two and three-wheelers in Kenya
- ✓ Draft Report already complete, awaiting National Validation Workshop and launch in due course.
- ✓ So far, the programme has updated the registration status of electric mobility.

KENYA'S ELECTRICITY SECTOR

>INSTALLED CAPACITY.



KenGen 799MW
IPPs 163MW

GEOTHERMAL – 962MW



KenGen 826MW
IPPs 12MW

HYDRO – 838MW



KenGen 25MW
IPPs 411MW

WIND – 436MW



Uganda 50MW
Ethiopia 200MW

BIOMASS – 2MW



SOLAR – 210MW



THERMAL – 646MW



IPPs 163MW

- ✓ KenGen 24PPAs: 1,905MW (59% of the Market)
- ✓ IPPS 22PPA's: 1,088MW (34% of the Market)
- ✓ Imports 1PPA: 200MW (6% of the Market)
- ✓ REREC 1 PPA: 50MW (2% of the Market)

REREC 50MW
IPPs 160MW

KenGen 254MW
IPPs 392mw

Off-grid = 38.4MW
Thermal 35.5MW
Solar 2.3MW
Wind 0.6MW



PEAK DEMAND 2,170 MW

3,322 MW

KENYA'S ELECTRICITY SECTOR-CONT.

>GENERATION MIX

THERMAL SOURCES

2022 - 12.4% | AUG 2023 - 7.8%

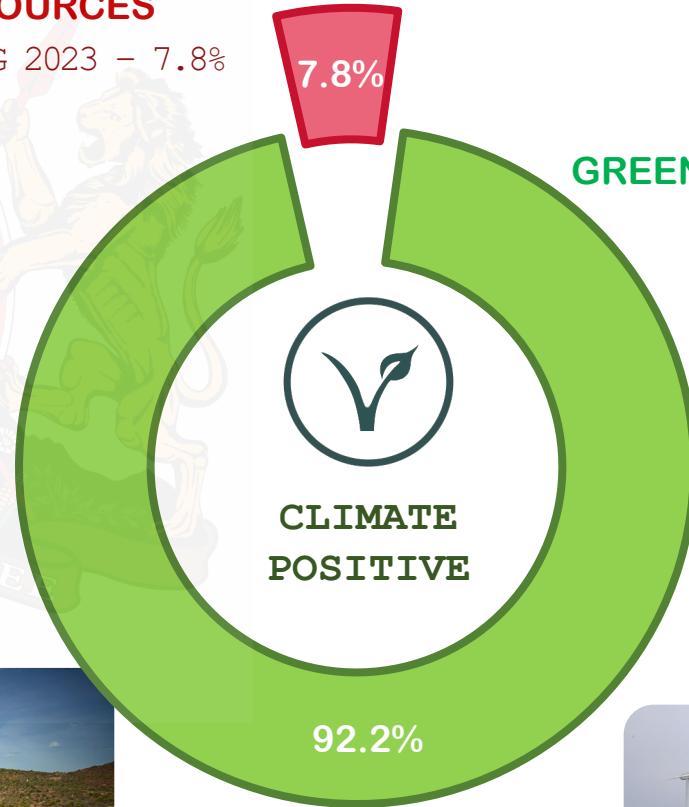
7.8%



45.3% GEOTHERMAL



22.4% HYDRO



GREEN SOURCES



3.5% SOLAR



4.8% IMPORTS

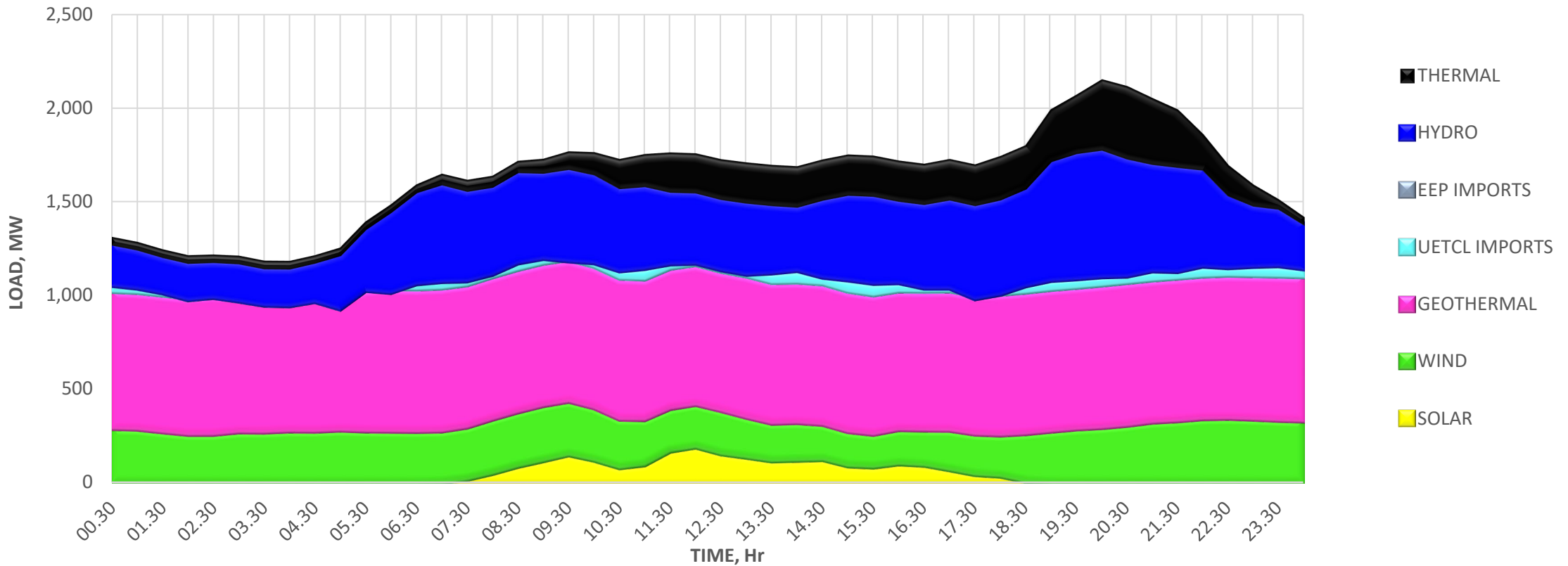


16.2% WIND

KENYA'S ELECTRICITY SECTOR-CONT.

>LOAD PROFILE-HIGH PEAK LOAD (2,164MW) 25TH JULY, 2023

Load Profiles, 25th July 2023



➤ 70% EV charging can be done from 22:00Hrs to 06:00Hours. This will help bridge the gap between off-peak load available generation capacity as well as raise the average demand.

ROLE OF ENERGY SECTOR IN SUPPORTING THE E-MOBILITY SECTOR

➤ EPRA's mandate to establish a regulatory framework for electric mobility guided by:

Section 163 - 166

- Tariffs and contracts for electricity supply of electrical supply and network services

Section 117 - 147

- Licensing of power undertakings (generation, transmission, distribution and retail).

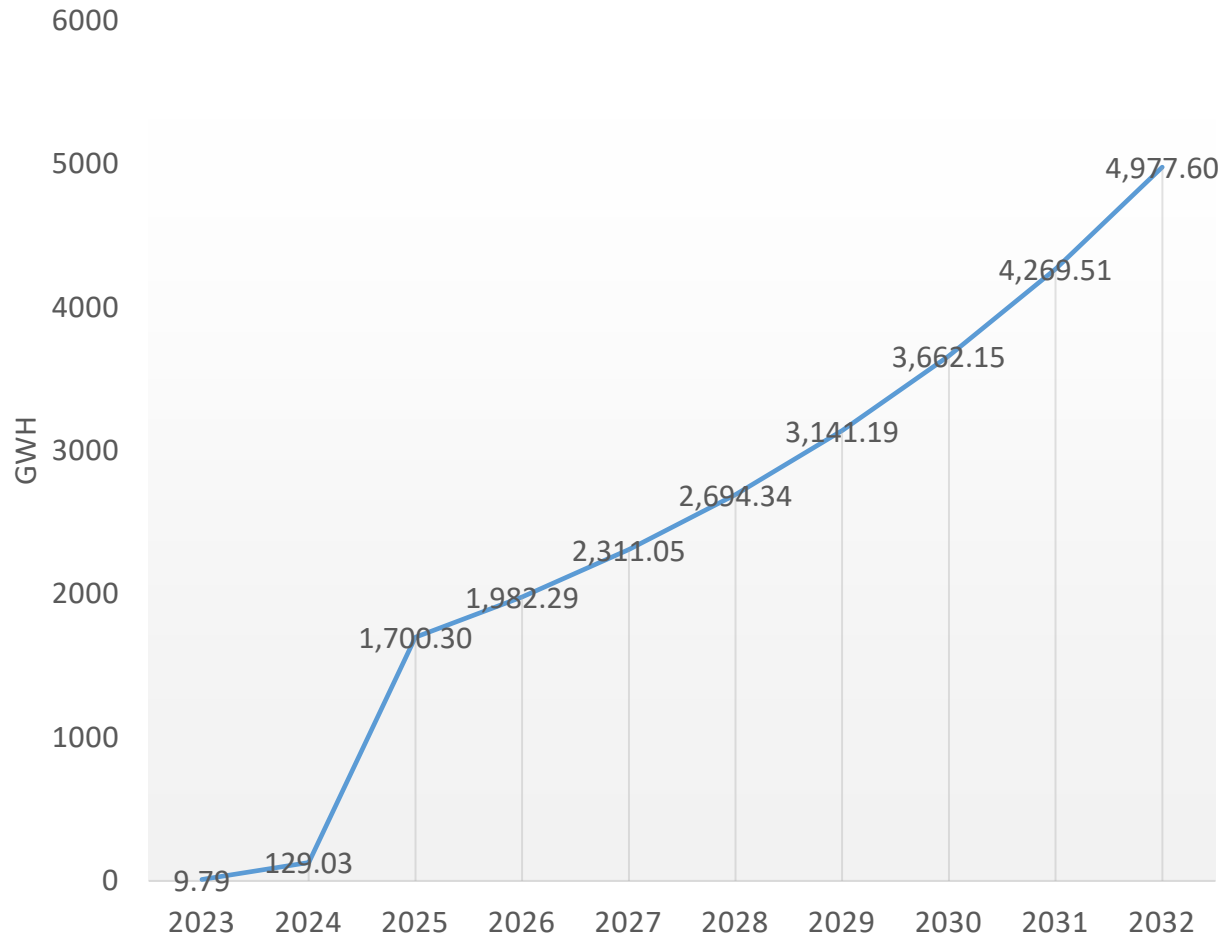
Section 148 – 153

- Licensing of electrical installation workers and contractors.

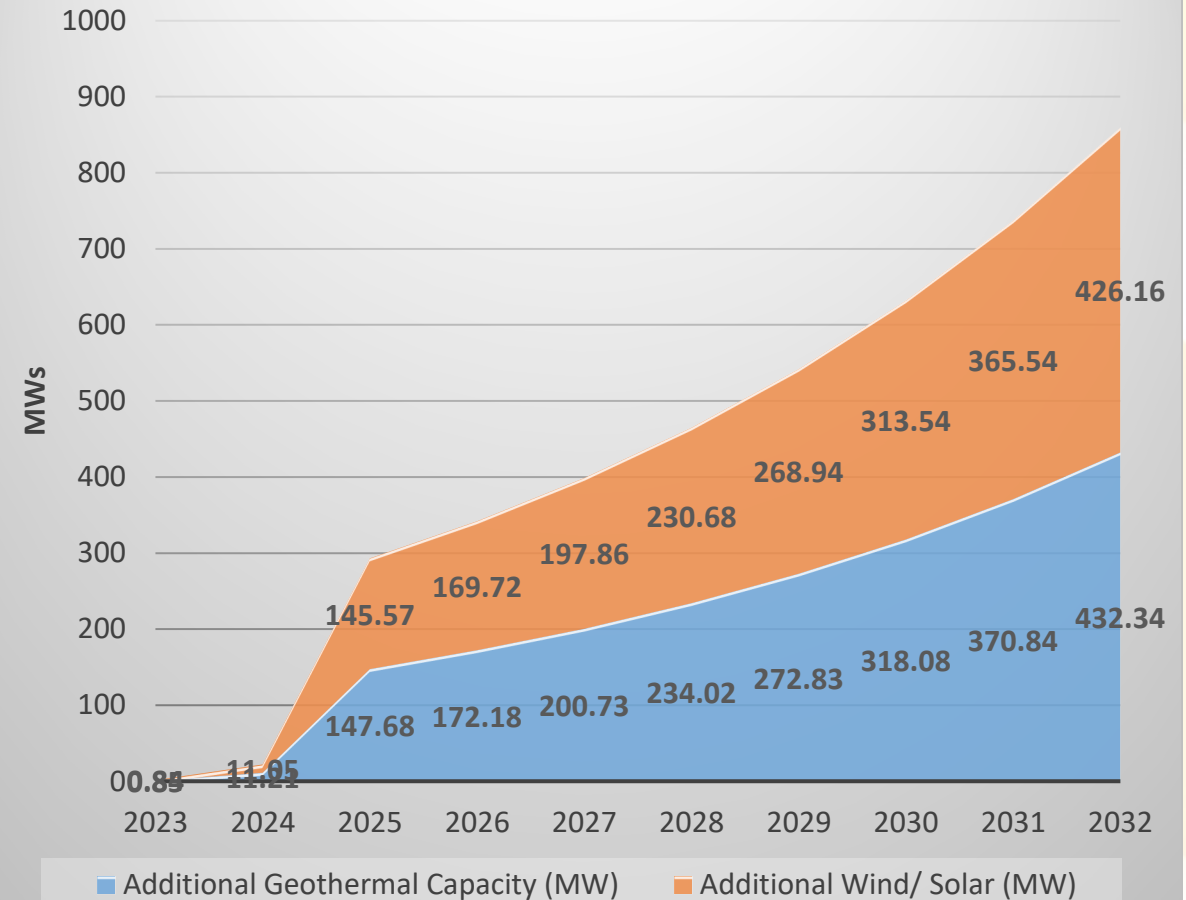
➤ Need for energy sector to plan for a systematic increase in generation from renewable energy sources that will accommodate the exponential growth in demand for electricity brought by e-mobility and to improve the flexibility of the grid

CASE FOR INCREASED RE GENERATION

Projected EV Consumption (GWh)



Projected Additional Capacity Need (MWs)



1. E-motorcycle Swapping Model (Company 1)

Cost of an electric boda – KShs 185,000

Single swap – KShs. 185 per swap (Average swaps for an e- boda per day is 2 swaps)

Full Battery – approx. 70 kms

Charging time – 3hrs for slow charger and 1.5-2hrs for fast charger

2. E- motorbike Swapping Model (Company 2)

Cost of an electric bike – KShs. 180,000

Single swap – KShs. 185 per swap

Unlimited swaps – KShs. 350 per day

Full Battery – approx. 60kms

Charging time – 3hrs

FINANCIAL ANALYSIS & COST SAVINGS ON EVs

E-BUS

Category	Daily consumption	Total Unit Cost	Total cost per day	Electricity Cost per unit	Charging Station Mark up
Electricity e-bus (115kWh)	at peak - 34.5 kWh	44.22	1,525.74	26.09	18.13
	at off- peak - 80.5 kWh	36.22	2,916.06	18.09	18.13
	Total electricity cost			4,441.81	
Petrol e-bus	65 ltrs for 260 km	179.67	11,678.55		
	Daily Savings(KShs)		7,236.74		

E-CAR

Category	Daily consumption	Total Unit Cost	Total cost per day	Electricity Cost per unit	Charging Station Mark up
Electricity e-car (36kWh)	at peak - 10.8 kWh	45.00	486.00	26.09	18.91
	at off- peak - 25.2 kWh	37.00	932.51	18.09	18.91
	Total electricity cost			1,418.51	
Petrol e-car	14.55 ltrs for 240 km	194.68	2,831.71		
	Daily Savings(KShs)		1,413.20		

E-BODA

Category	Daily consumption	Total Unit Cost	Total cost per day	Electricity Cost per unit	Charging & BS Station Mark up
Electricity e-boda (5kWh)	at peak - 1.5 kWh	52.54	78.81	26.09	26.5
	at off- peak - 3.5 kWh	44.54	155.91	18.09	26.5
	Total electricity cost			234.72	
Petrol e-boda	3.8 ltrs for 190 km	194.68	739.78		
	Daily Savings(KShs)		505.07		

ELECTRIC VEHICLE (EV) CHARGING AND BATTERY SWAPPING INFRASTRUCTURE GUIDELINES, 2023

PURPOSE

- To make electric vehicle charging infrastructure accessible to all users.
- To enable faster adoption of electric vehicles in Kenya by ensuring safe, reliable, accessible, and affordable charging infrastructure and eco-system.
- To promote affordable tariffs chargeable from Electric Vehicle (EV) owners and Charging Station Operators/Owners.
- To generate employment/income opportunities for small entrepreneurs.
- To proactively support creation of EV Charging Infrastructure in the initial phase and eventually create a market for the EV Charging business.
- To encourage preparedness of Electrical Distribution System to adopt EV Charging Infrastructure.
- To create uniformity and certainty towards accelerated adoption of EVs in

SCOPE

- Apply to individuals, firms, and institutions intending to install, operate and maintain a Public/Private Charging Station and Battery Swapping Stations and to users where applicable.

ELECTRIC VEHICLE (EV) CHARGING AND BATTERY SWAPPING INFRASTRUCTURE GUIDELINES, 2023

APPLICATION

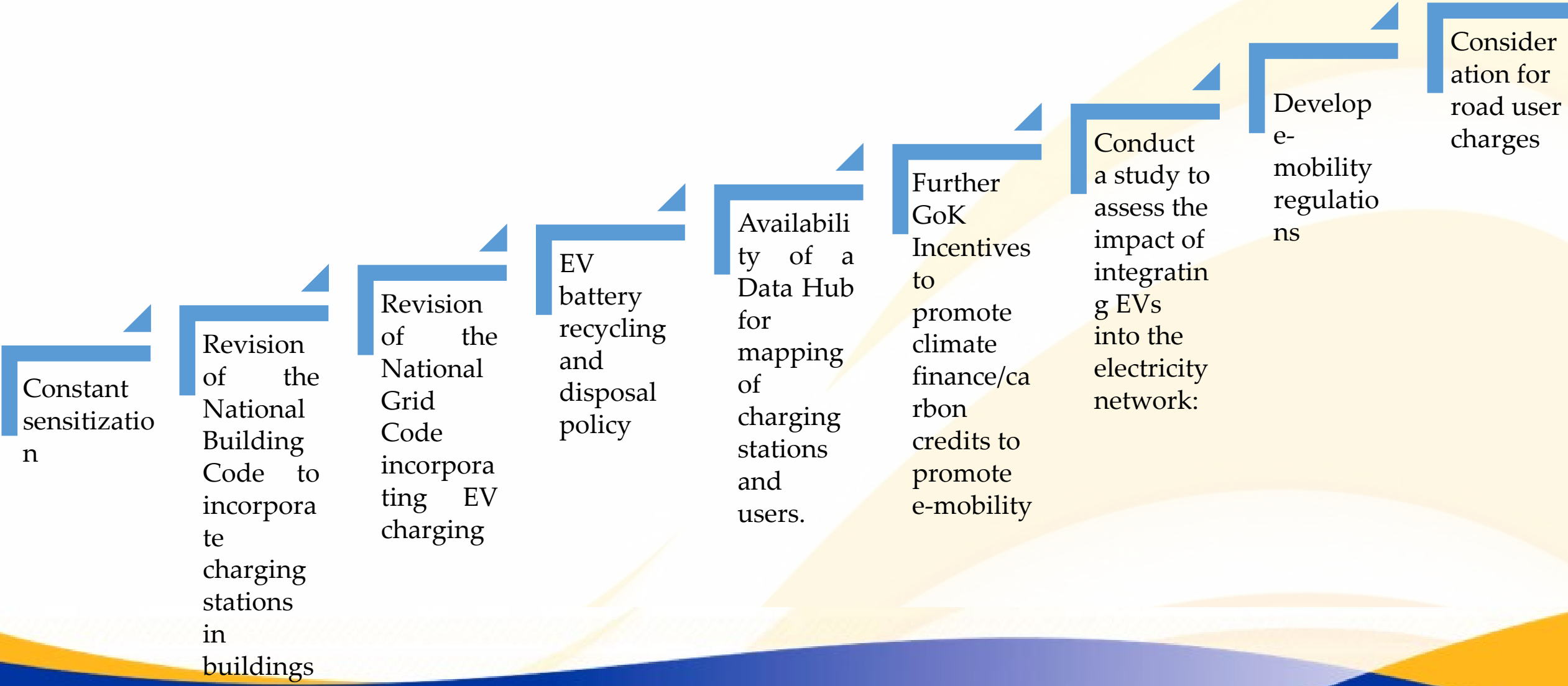
- Public Charging Infrastructure Requirements
- Private Charging Infrastructure Requirements
- Battery Swapping Stations Requirements
- Installation Documentation, Warranty, and Insurance
- Location and Database of Public Charging Stations
- Signage, Markings and Accessibility Considerations
- Tariff for Supply of Electricity to EV Public and Private Charging Stations/Points
- PCS/BSS Charging Price and Payment Method
- Charge Point Measuring System
- Smart Functionality
- EV Charging Infrastructure Communication.
- Customer Service, Data Privacy, Data Sharing and Security
- Complaints and Dispute Resolution

KEY PROVISIONS

- ✓ Setting up of Charging Stations is a licensed activity/undertaking
- ✓ Public Charging Stations shall be operational only after inspection and clearance as communicated by a suitable Clearance Certificate, issued by a duly authorized electrical inspector/contractor/worker.
- ✓ Capacity building of electrical contractors and workers to handle EV charging installations and electrical installations
- ✓ Detailed designs prepared by professional engineers describing electrical fittings, cables, protective devices and earthing systems suitable for hazardous/potentially explosive environments such as petrol stations.
- ✓ Compliance with the requirements of the Kenyan Grid Code and relevant electrical installation standards.
- ✓ EV charging infrastructure such as energy meters should be type-tested by an accredited agency/laboratory.
- ✓ The tariff for supply of electricity to EV charging stations shall be as approved and gazetted by EPRA.
- ✓ Tariff applicable for E-mobility shall also be applicable for domestic charging.
- ✓ Separate metering arrangement shall be made for both private and public charging stations

WAY FORWARD

✓ Steps and future actions to achieving the goal of a sustainable transition to e-mobility.



Thank You

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