Electric Mobility Barriers and Enablers in Ghana

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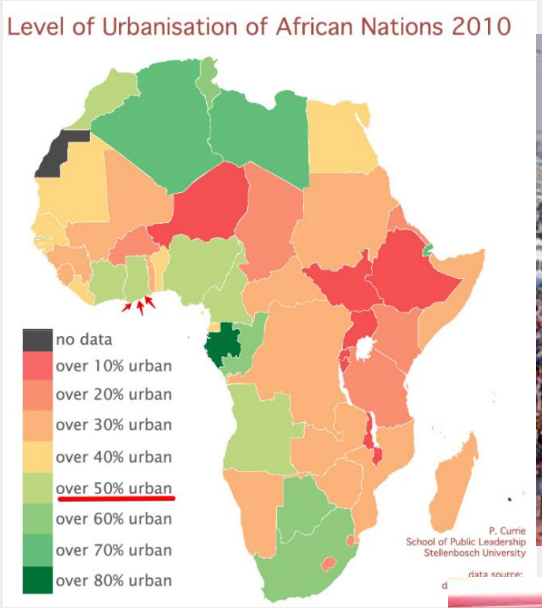
Outline of the Presentation

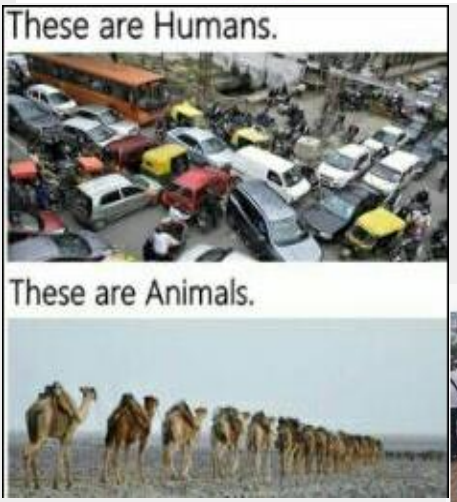
- **Introduction & Methodology**
  - Brief background/ Policy initiatives
  - Project objectives
  - Framework/Data and sources
- **EV Barriers & Enablers**

-Barriers tree ranking

-Enablers (policy goals & initiatives)

Africa & Ghana is fast urbanising with attendant mobility challenges e.g. congestion, air pollution, fossil-fuel dependency etc





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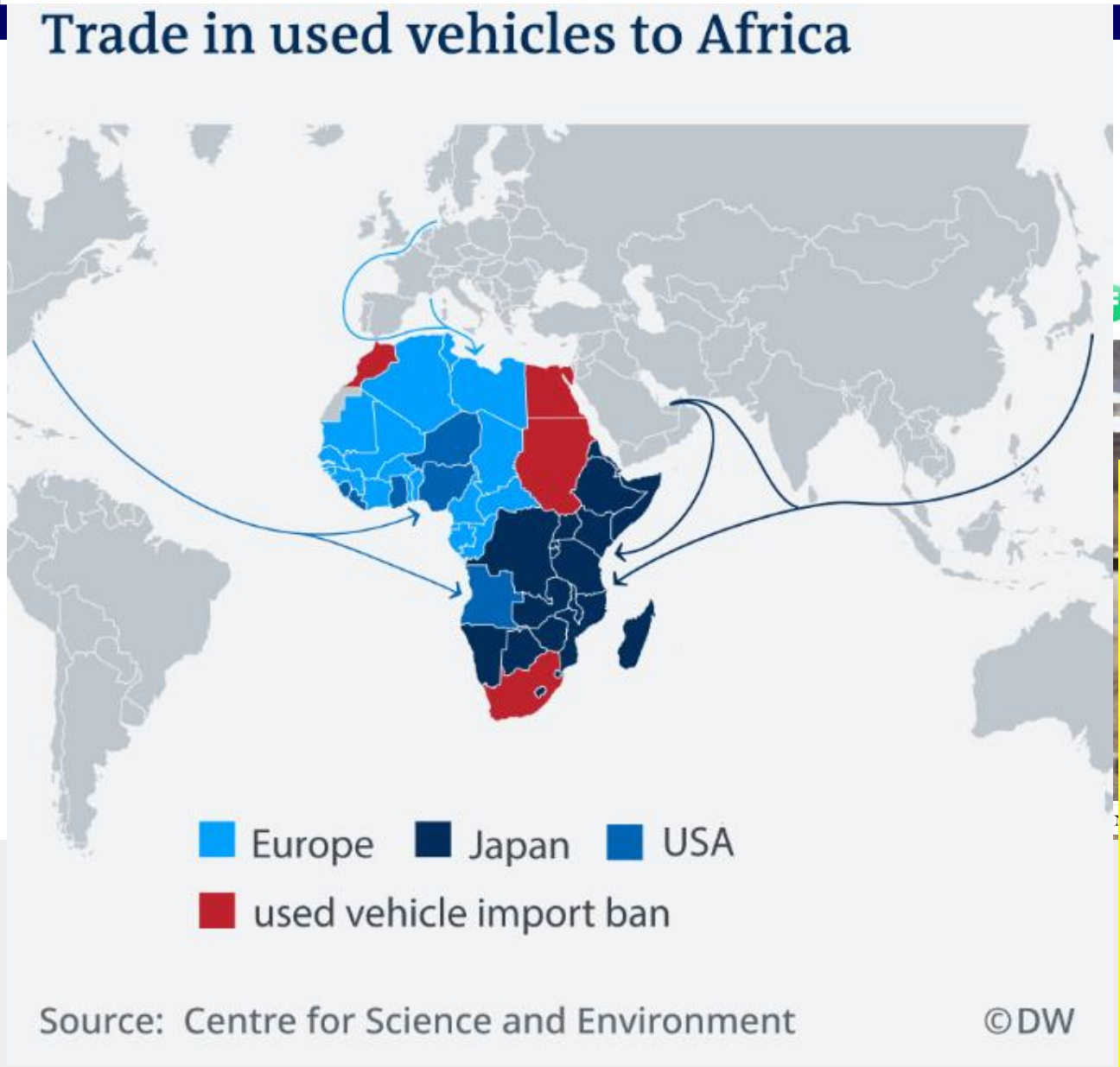
GLOBAL RESPONSE (Governments & Industry Players)



Ghana/Africa risk becoming a dumping ground, yet again?

"Drive Electric Initiative" to shore up productive use of excess electricity in Ghana

Project Objectives

- Develop **electric-mobility policy, and market readiness and implementation framework** to transform Ghana's transport sector into a modern, sustainable, and results driven sector
- Deliver an **implementation roadmap** and **business case** for E-Vehicles and charging infrastructure deployment
- Assess the **market feasibility** of e-mobility and **EV charging infrastructure** to enable deployment of EVs
- Build the **capacity of stakeholders** and **promote public awareness** and understanding of EV potential, to facilitate the deployment and scale-up of EVs

Highlights of previous key findings

1. Attitudes toward Government's EV adoption policy

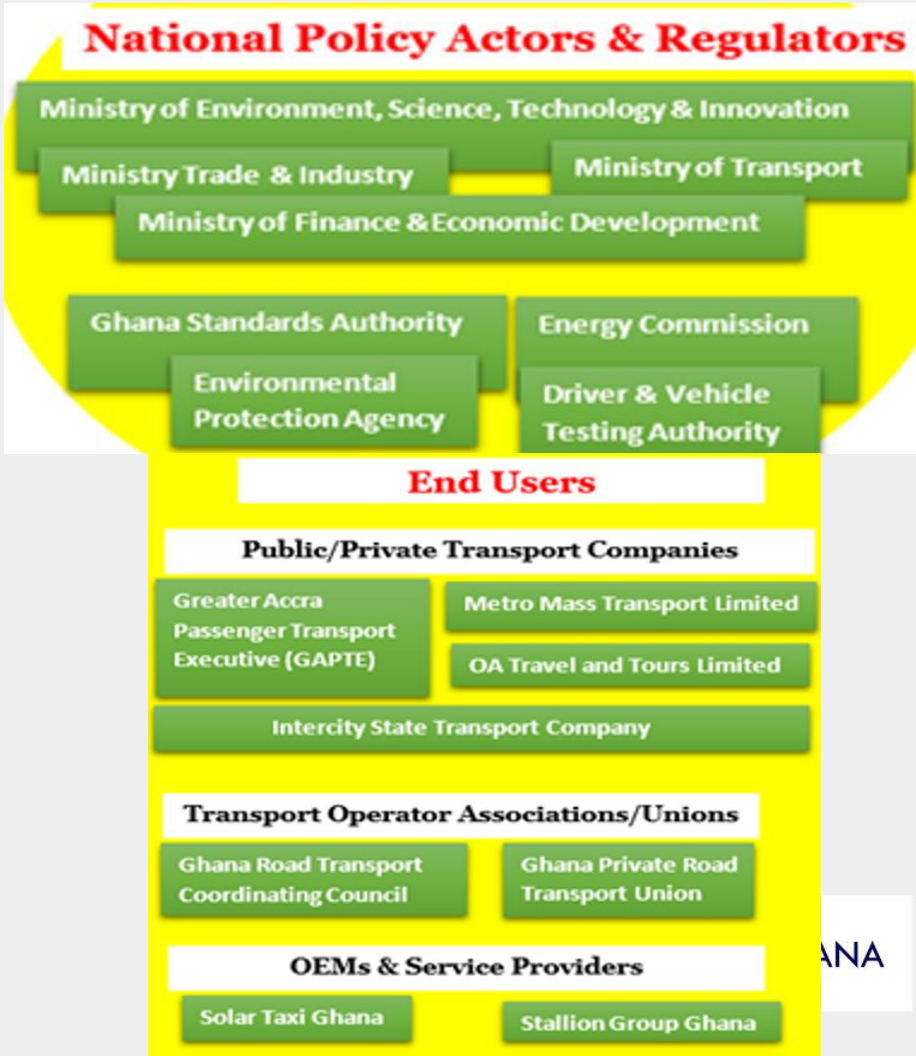
2. Reasons for support

Key findings Cont'd

3. Buses and Cars prioritized for EV adoption

Usage type	Modes	Overall Score	Percent Score by usage type
Commercial	Bus	70.11	34.2
	Trotro	65.08	31.8
	4w-Taxi	69.71	34.0
Personal	Car	55.64	36.5
	3W-Personal	47.24	31.0
	2W-Personal	49.55	32.5

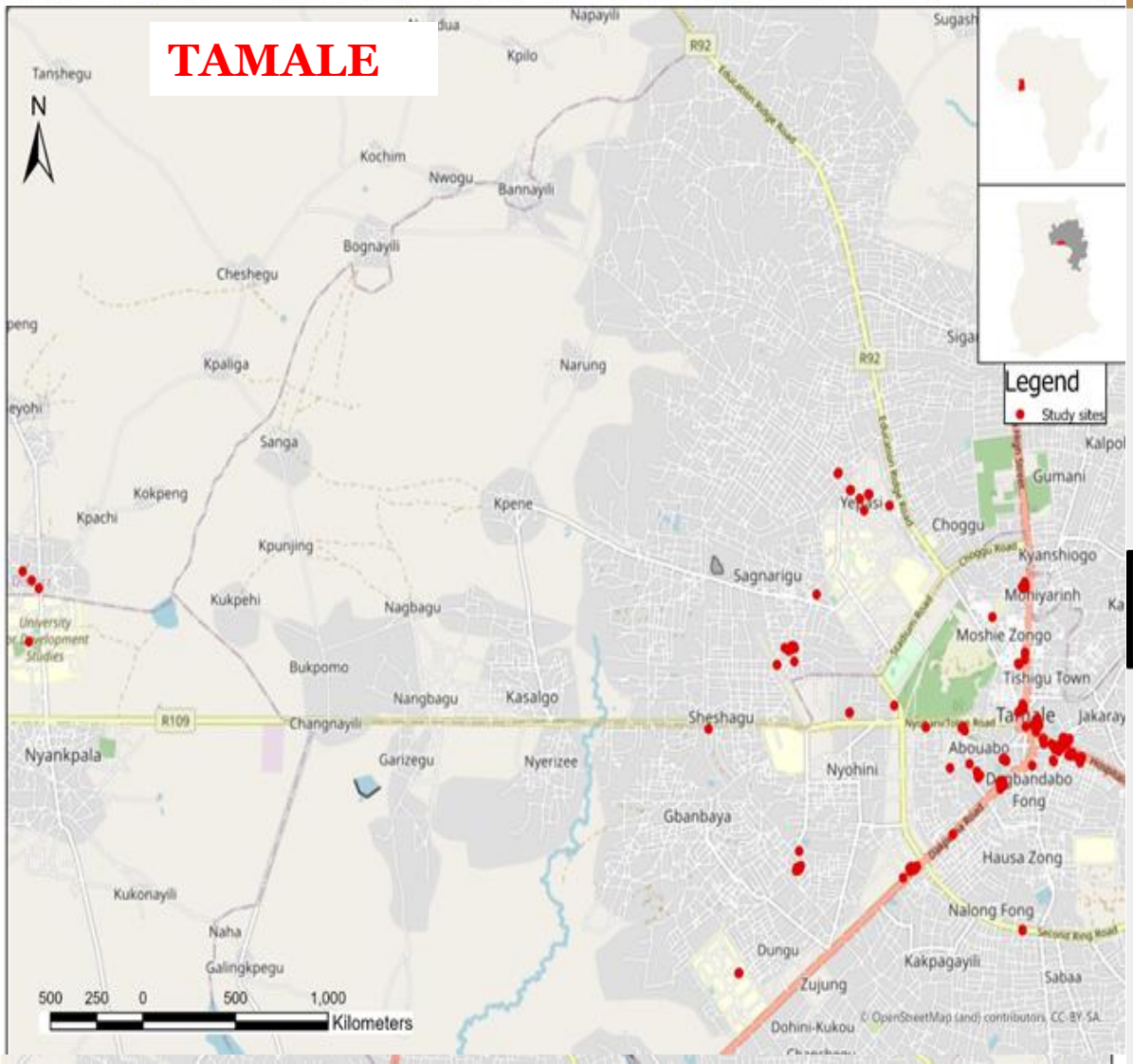
Methodology for EVs Barrier Analysis



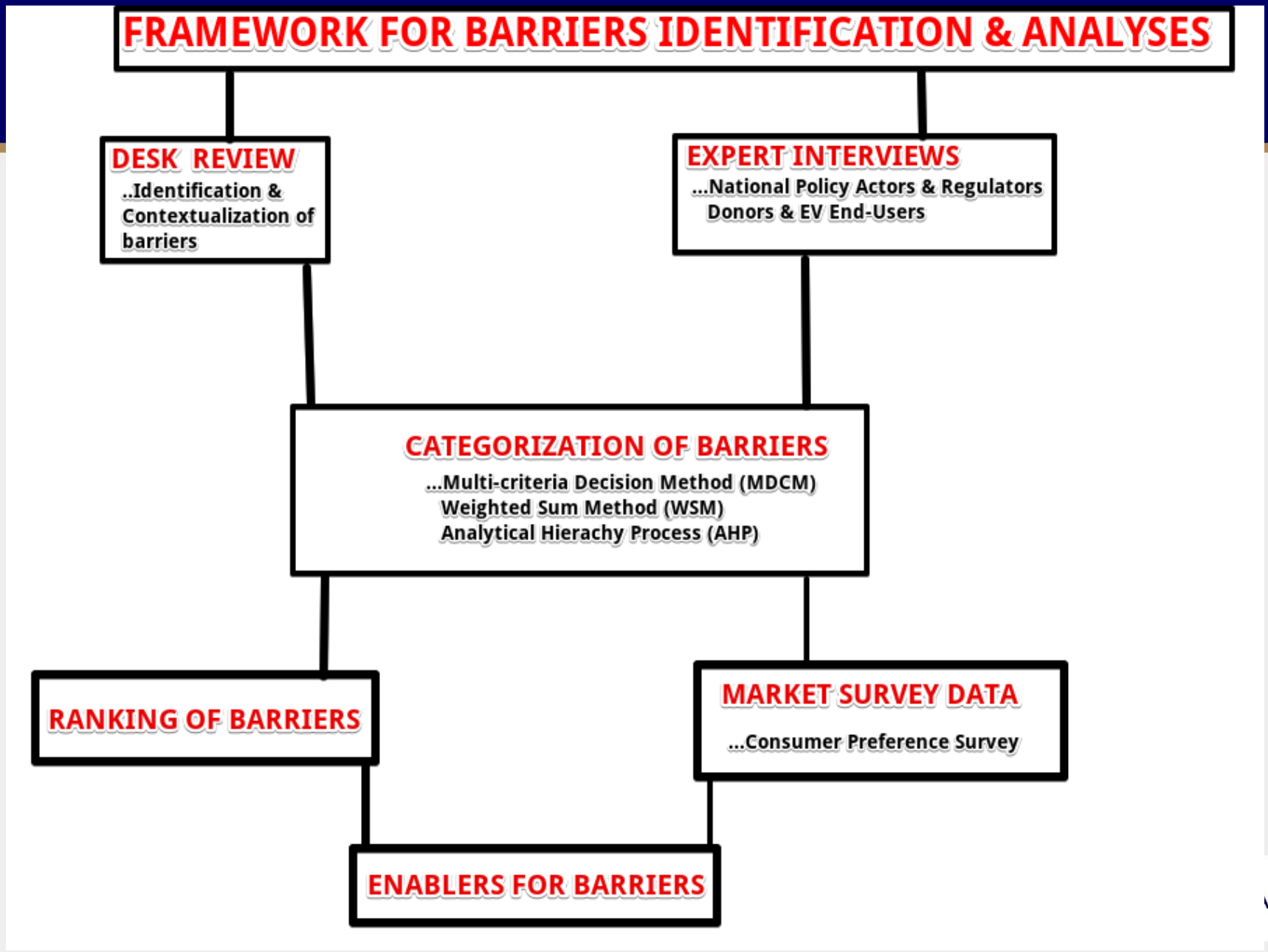
FRAMEWORK FOR BARRIERS IDENTIFICATION & ANALYSES

DESK REVIEW
..Identification & Contextualization of barriers

EXPERT INTERVIEWS
...National Policy Actors & Regulators
Donors & EV End-Users



MARKET SURVEY DATA
...Consumer Preference Survey


FRAMEWORK FOR BARRIERS IDENTIFICATION & ANALYSES
DESK REVIEW
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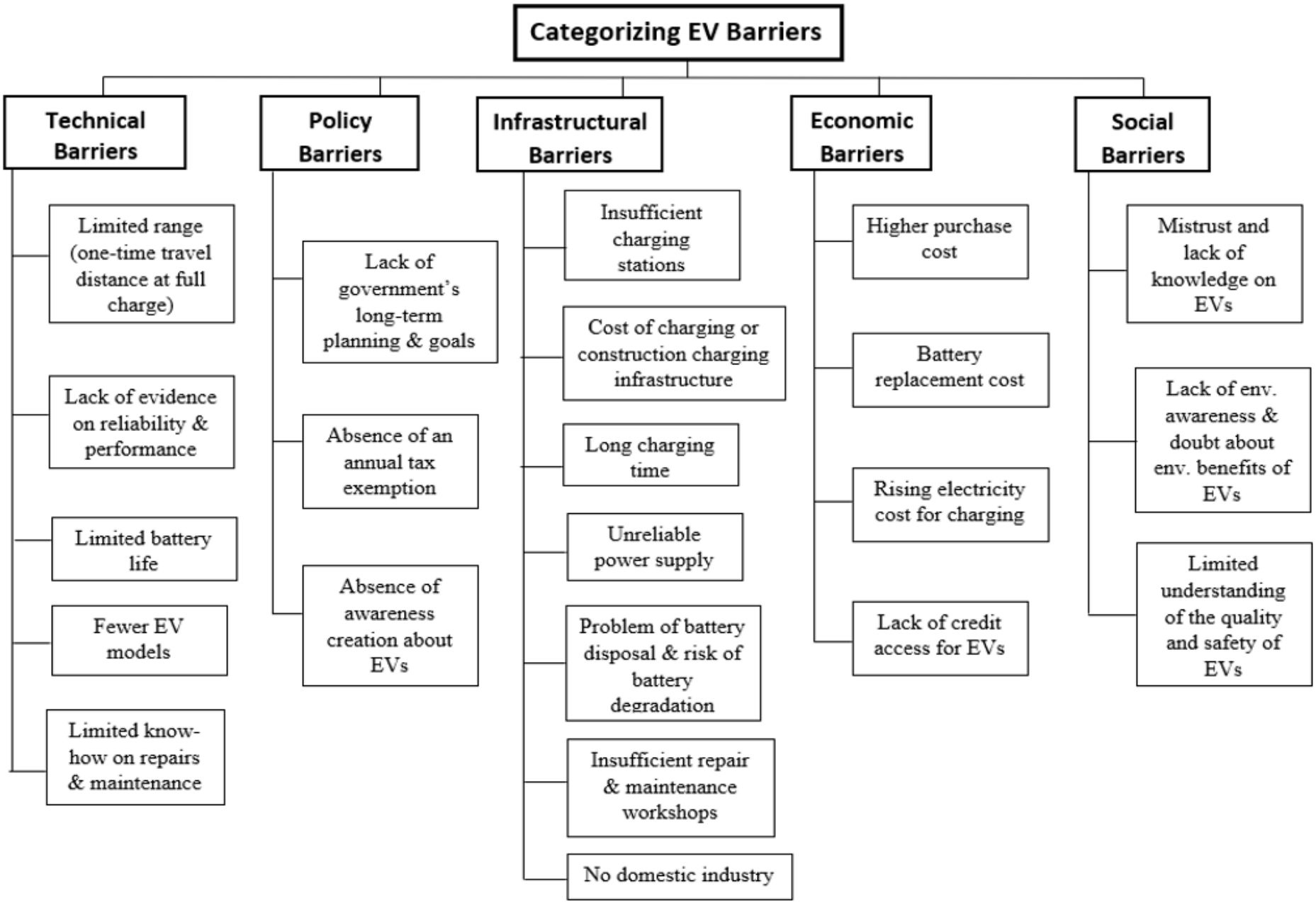
CATEGORIZATION OF BARRIERS
...Multi-criteria Decision Method (MDCM)
Weighted Sum Method (WSM)
Analytical Hierachy Process (AHP)
RANKING OF BARRIERS
MARKET SURVEY DATA
...Consumer Preference Survey
ENABLERS FOR BARRIERS

Hierarchical tree for ranking EV Barriers in Ghana



Barrier categories

Barrier Categories (L1)	L1 Weightage	Barrier sub-Categories (L2)	L2 Weightage
Economic	33.3	Higher purchase price	40
		Battery replacement cost	30
		Risk of rising electricity price for charging	10
		Lack of credit access for EVs	20
Technical	20		
Infrastructure	26.7		
Policy	13.3		
Social	6.7		

"Charley, honestly, I don't think I will have such money to buy an electric vehicle. My income overtime even till pension cannot buy the EV cars. My finances are not too good" (A 47-year-old Management Accountant, Accra)

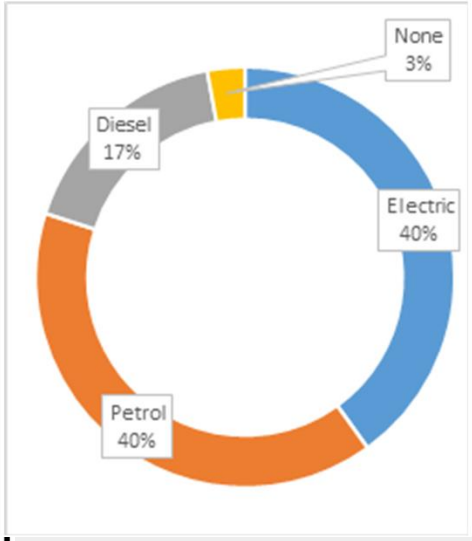
"The electric cars are meant for the rich. Even in the Developed World, it is not everyone who can afford it" (A 30-year-old Engineer at the DVLA office, Tamale)

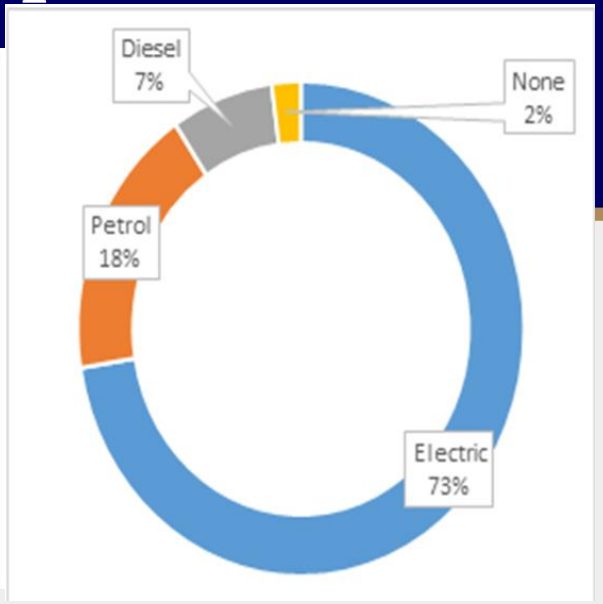
"Initial price of this car is very expensive. I could keep the balance for other better things if I were to buy a fuel or diesel [ICE] car". (A 49-year-old car spare parts dealer, Kumasi)

Modelling initial cost effect on EV adoption

"Market Conditions"

	Type 1: ELECTRIC	Type 2: PETROL	Type 3:DIESEL
Top Speed: 167km/h		210 km/h	183 km/h
Range: 415 km (~Accra-Kintampo)		612 km/h (~Accra-Tamale)	612km/h
Fuel Consumption ratings: 2.0 Le/100 km		7.4 Le/100 km	8.5 Le/100 km
Charging /Fuel cost ($/yr): 325		1137	1042
Maintenance cost ($/yr.): 320		640	640
Purchase Price:	$44,999 GHS 269,475	$22,500 GHS 134,741	$ 25,500 GHS 152, 706





"Policy interventions"

POLICY BENEFITS

	Type 1: ELECTRIC	Type 2: PETROL	Type 3: DIESEL
Infrastructure:	No Parking Fees	None	None
Congestion:	Priority driving lanes	None	None
Road tolls:	No tolls payment	None	None
Charging infrastructure:	Quick charging at home	None	None

"Fiscal interventions"

FINANCIAL BENEFITS

	Type 1: ELECTRIC	Type 2: PETROL	Type 3: DIESEL
Financing (8 years):	Lower rate at 15%	Regular at 24%	Regular at 24%
Import duty	Nil	20%	20%
VAT	Nil	12.5%	12.5%
NHIL	Nil	2.5%	2.5%

Barrier categories Cont'd

Barrier Categories (L1)	L1 Weightage	Barrier sub-Categories (L2)	L2 Weightage
Technical	20	Limited driving range (one-time travel distance at full charge)	33.3
		Lack of evidence on reliability and performance	13.3
		Limited battery life	26.7
		Fewer EV models and types	6.7
		Lack of technical know-how on repairs and maintenance	20

"So what will happen if the battery runs down at a place where there is not light[electricity] to charge it? How long can the electric car last?" (A 40-year-old car mechanic around Kaladan Park in Tamale)

"Talking about driving range, in case you have an important meeting let's say at Tamale and you need to travel in an electric car from Accra, you may have to pause the driving at least twice and charge it before you continue. Meanwhile, when I fill my petrol car to full capacity, I can make the same journey without interruptions" (A 35-year-old Auditor, Kumasi)

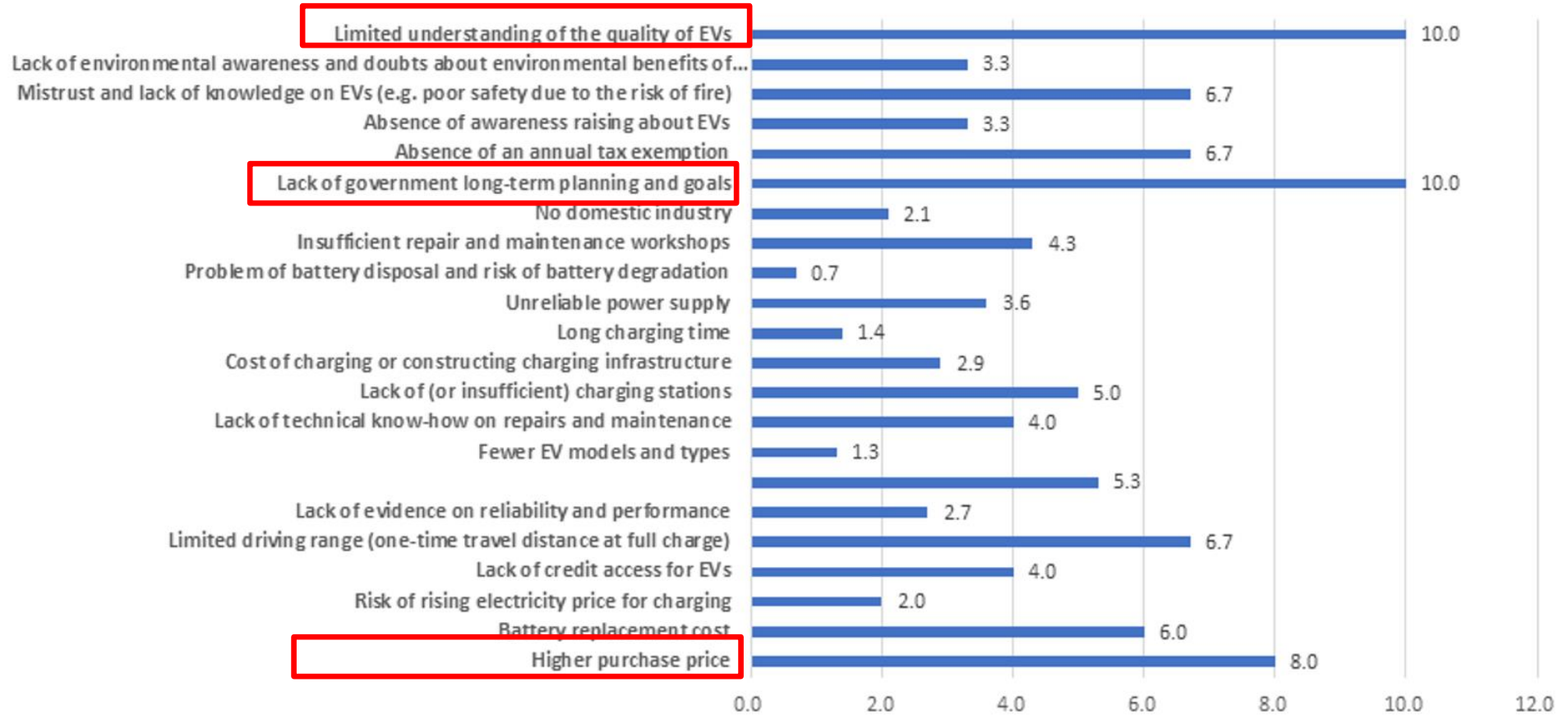
Barrier categories Cont'd

Barrier Categories (L1)	L1 Weightage	Barrier sub-Categories (L2)	L2 Weighta
Infrastructure	26.7	Lack of (or insufficient) charging stations	25.0
		Cost of charging or constructing charging infrastructure	14.3
		Long charging time	7.1
		Unreliable power supply	17.9
		Problem of battery disposal and risk of battery degradation	3.6
		Insufficient repair and maintenance workshops	21.4
		No domestic industry	10.7
Policy	13.3	Lack of government long-term planning and goals	50.0
		Absence of an annual tax exemption	33.3
		Absence of awareness raising about EVs	16.7
Social	6.7	Mistrust and lack of knowledge on EVs (e.g. poor safety due to the risk of fire)	33.3
		Lack of environmental awareness and doubts about environmental benefits of EVs	16.7
		Limited understanding of the quality of EVs	50.0

""When I get a shortage [of fuel], I can take a gallon and go to the [nearest] fuel station to purchase some, but this is not possible with the EV. There is no way I can leave the car behind and go looking for a charging facility" (A 38-year-old-banker,Osu, Accra)

"As for me, I think that a brand-new petrol or diesel car with good exhaust equally emits fewer polluting gases into the atmosphere. In my view, the [EV] car really doesn't have any advantage over other cars [ICEs] in terms of promoting a cleaner air" (A 46-year-old human resource manager, Kumasi)

Overall ranking of barriers (weight in percentages)



Enablers to EV adoption

Policy Goal	Policy initiative
Improve economic & fiscal measures to accelerate uptake of EVs	Introduce **tax waivers** and **tax holidays** for full EVs (over specified period after which re-imposition is encouraged)
	Implement **special electricity** (energy) **tariff** for EVs (i.e., differentiated and subsidised tariff system for EV charging (e.g. from 8pm to 6am)
	Provide affordable **electricity price** for charging EVs
	Sale of Carbon surpluses arising from EV adoption on carbon market platforms, including the Chicago Climate Exchange (CCX), the European Energy Exchange (EEX), European Climate exchange (ECX) to offset revenue losses
Develop institutional framework, policy and regulatory measures to drive and promote the use of EVs	**Review of the Harmonised System (HS) Customs code** (to facilitate proper estimation of import duties, and related issues of registration)
	Standardisation, licensing and certification of EVs and related components (proper regulation of chargers, charging systems and charging installation)
	Strengthen **research and capacity building** (especially at the TVET)
	Ensure **constant power** supply (e.g., through adoption of Geographic Information Systems and the Meter Management System (MMS) platforms)
	Encourage energy security through promotion of renewable EV charging and battery storage facilities
	Ensure close **collaboration among partnering ministries and agencies** (e.g., Ministry of Transport, Ministry of Finance, Energy Commission and Environmental Protection Agency) in promoting the transition to green technologies.
	Attract **funding** for promoting EV uptake (e.g., through the Sustainable Use of Natural Resources Energy Finance (SUNREF)
	Implement **reforms** including importation of overaged vehicles to meet best practices

Enablers to EV adoption Cont'd

Policy Goal	Policy initiative
Develop and expand infrastructural measures to support the deployment of EVs	**Promotion of private** (home) **charging** systems (e.g., through solar energy or the national electric grid)
	Installation of multiple public charging points in major cities (especially at fuel filling stations, parking spaces, street-side parking lots, office parks, service stations and depots to reduce charging waiting time;
	Installation of **inter-city charging points** (through partnerships with popular oil marketing companies to install public charging points at filling stations along the Coastal and Central national highways; also, at major rest stops like Linda Dor and the Paradise Resort in the Eastern region, and elsewhere on these important highways)
	Adoption of contraflow **bus priority lanes** on existing urban roads for peak hour travels only where limited road space will disallow for dedicated BRT lane
	Provide **easily accessible fast chargers**, connectors, and charging systems in the market, at designated rest stops along national highways and prices regulated.
	Encourage the **installation of backup power systems** for charging stations to deal with power outages (e.g., Solar panels)
	Promote **battery swapping, recycling and end-of-life disposal** systems
	Promote **private sector participation** in the development and management of charging stations and facilities
Promote local EV development measures to accelerate the uptake of EVs	Review and enhancement of the **Ghana Automotive Development Policy** for ICEVs to provide enabling environment for local start-ups like Kantanka Automoble's *Amoanimaa* EV and other multinational companies that are already manufacturing or locally assembling vehicles
	Assembling **plant establishment** (taking cognisance and incorporating the operational framework of the automotive development policy.
	Ensure **local content and automotive standards** are enforced in the domestic industry

Enablers to EV adoption Cont'd

Policy Goal	Policy initiative
Accelerate improvements in technical measures to facilitate efficiency in the uptake of EVs	Encourage **longer range EVs** especially for long distance travels.
	Facilitate the continuous **training of local auto-mechanics/fitters, electricians, garage operators** etc
	Ensure **proper certification** of garages to efficiently handle EVs
	Promote low carbon **technology transfer** and develop local skills (artisans, operators, garage)
	Encourage the **retrofitting of ICEVs to EVs**: needed expertise should be developed. Local start-ups like Arke Global Technologies in Accra, and others should be identified and supported
Develop and scale up social measures to promote the use of EVs	Facilitate the **procurement, piloting and testing of EVs** to ensure their quality, safety, performance, and reliability (e.g., piloting with STC and Ayalolo buses on a few selected corridors (intra-city and inter-city respectively) as part of the BRT system.
	Promote the **adoption of buses with roof-top solar charging systems** to enhance battery life for long distance travels.
	Facilitate and promote the **addition of EVs to government vehicle fleet** (especially for the ministries, departments and agencies) to increase acceptability of EVs
	Implement a **roadmap on EV awareness creation and campaigns** (through broad grassroots consultation and inclusivity; Produce **easy-to-read leaflets, handouts, brochures**; aggressive **media campaigns** to improve knowledge on EVs

Acknowledgement

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- **Steering Committee**
- **Stakeholders**

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