



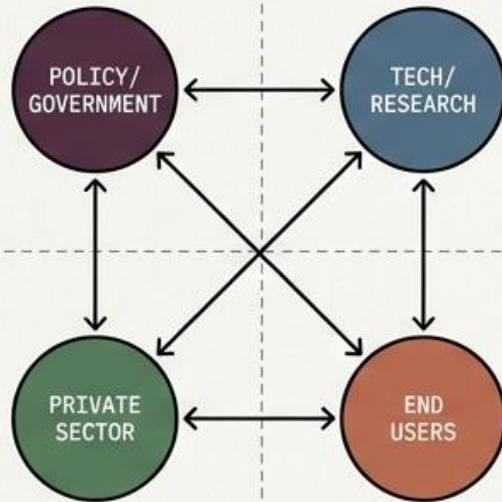
Stakeholder Role in the Sustainable Rollout of EV Technology in Developing Countries

Dr Obiora A. Nnene

EV deployment is a systems coordination problem.

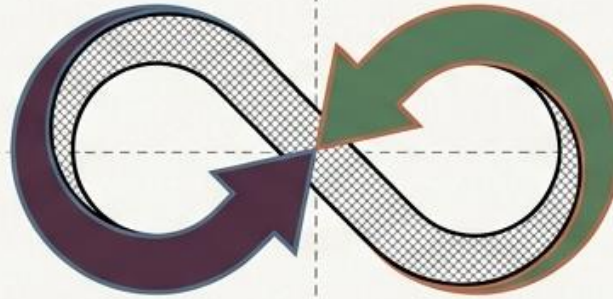
Sustainable adoption in developing nations fails when treated as a linear technology rollout. Success requires matching governance models and stakeholder roles to specific developmental contexts.

1. The Ecosystem



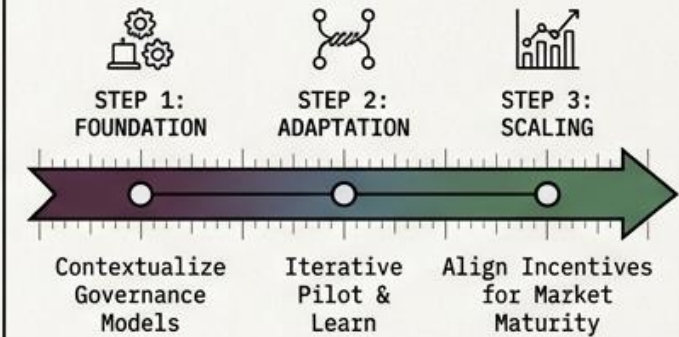
Interdependent actors with divergent incentives and capacities.

2. The Dynamics



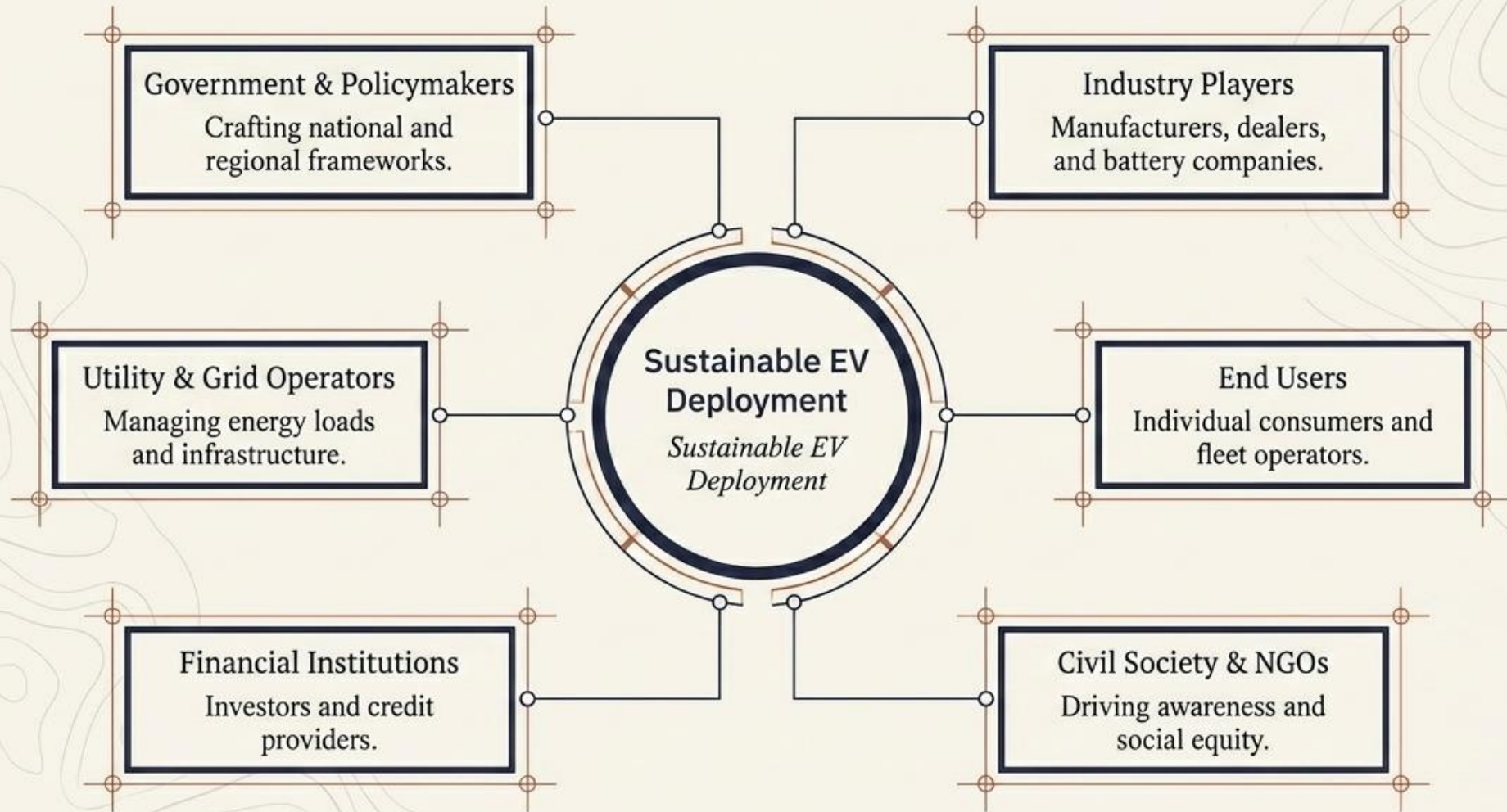
Systemic deadlock arises from mismatched roles and rigid approaches.

3. The Playbook



A staged, adaptive framework matching stakeholder roles to developmental phases.

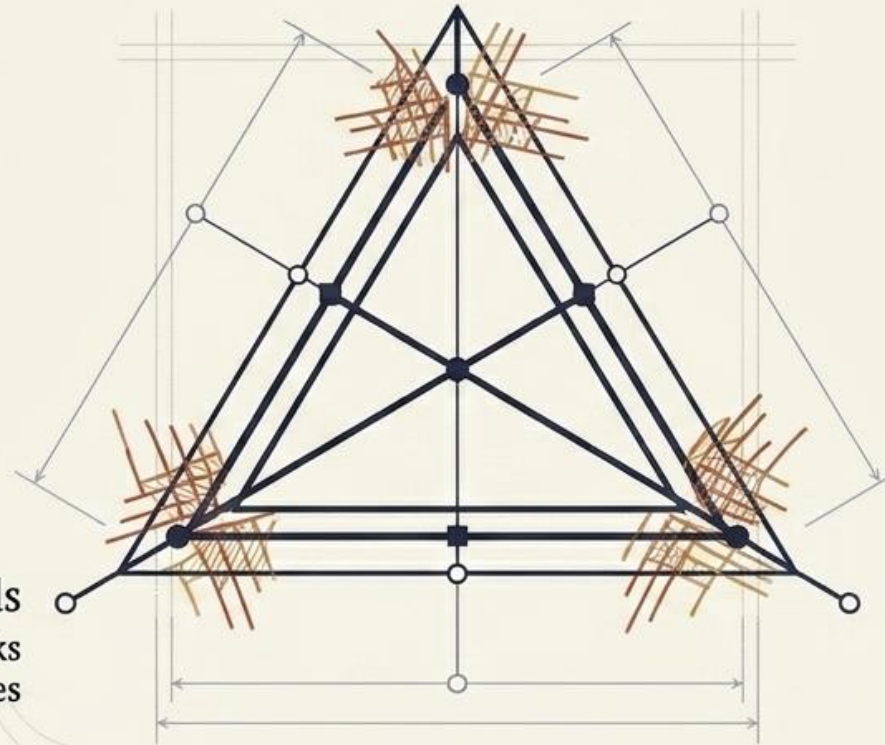
The EV Transition Requires a Six-Node Stakeholder Ecosystem



The Convergent Triangle of Deployment Barriers

Infrastructure Deficits

- Inadequate charging networks
- Unreliable grid capacity
- Poor road conditions



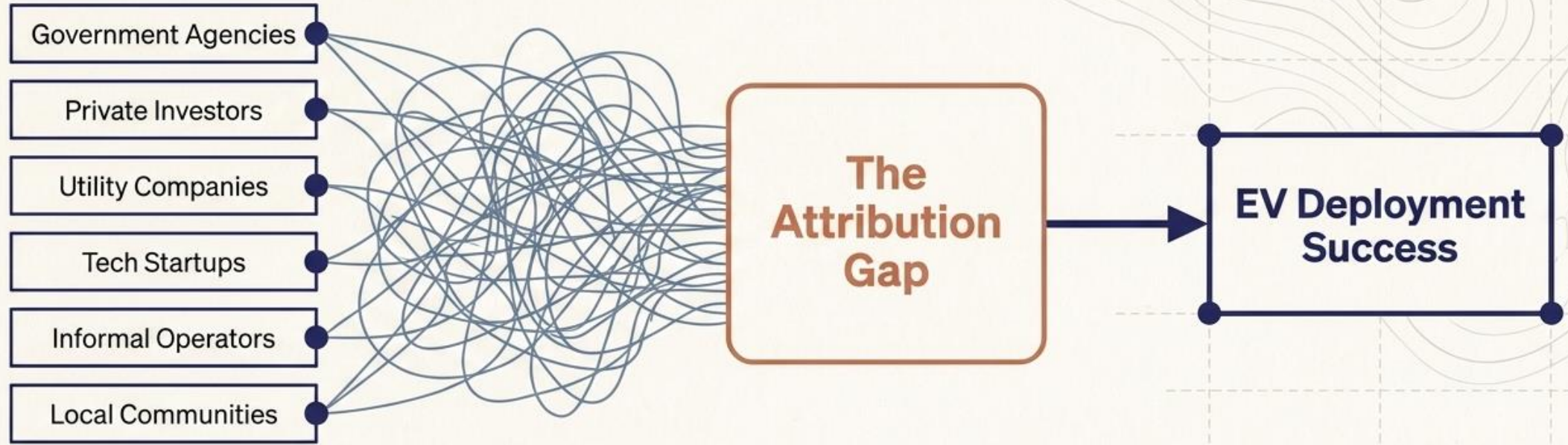
Policy Voids

- Fragmented regulatory frameworks
- Lack of fiscal incentives

Financial Friction

- High upfront vehicle costs
- Limited financing mechanisms

The Causal Attribution Gap

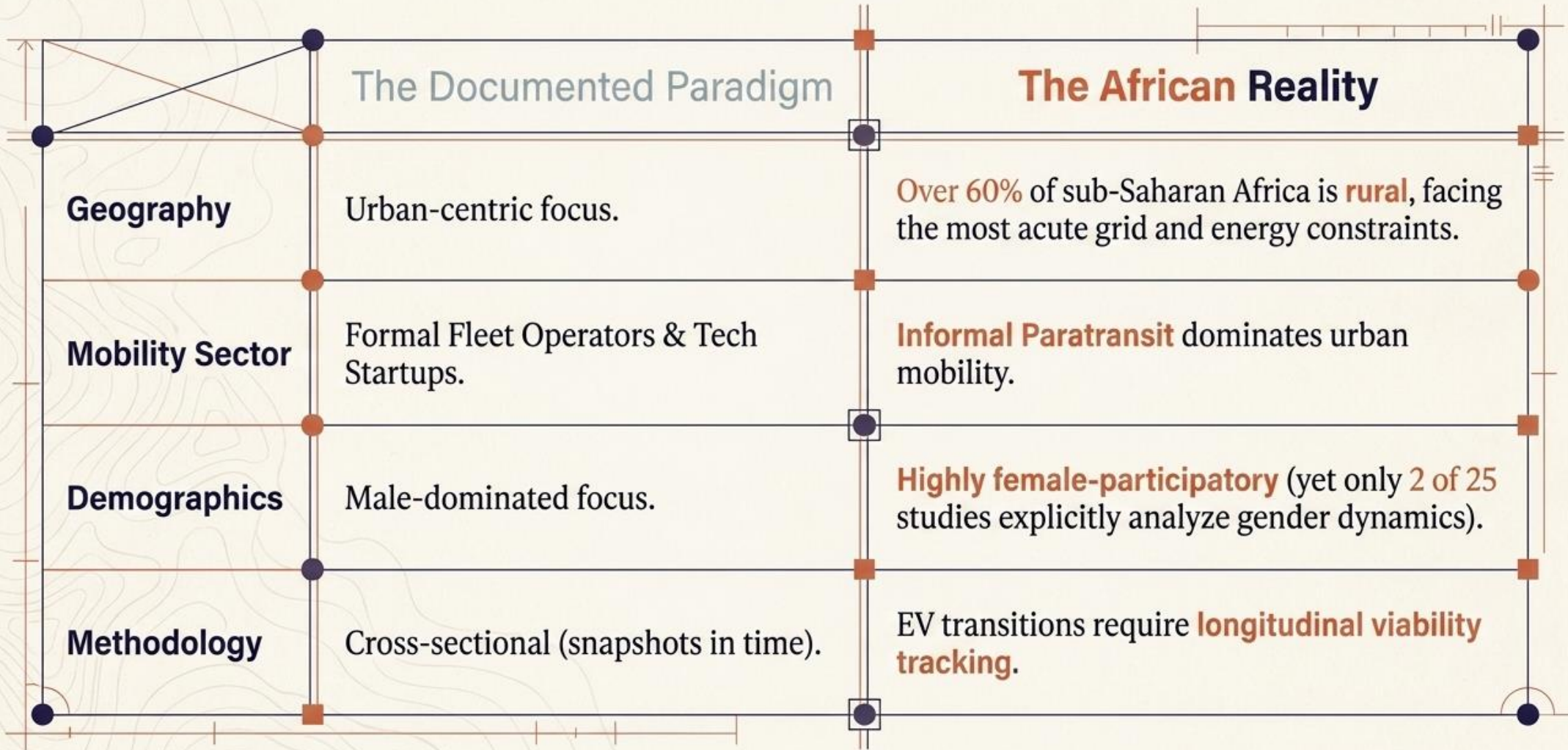


Because of the lack of controlled or quasi-experimental designs, we know successes occur, but we cannot attribute that success to specific

stakeholder actions. Policymakers have no data on which partnerships or interventions yield the highest ROI

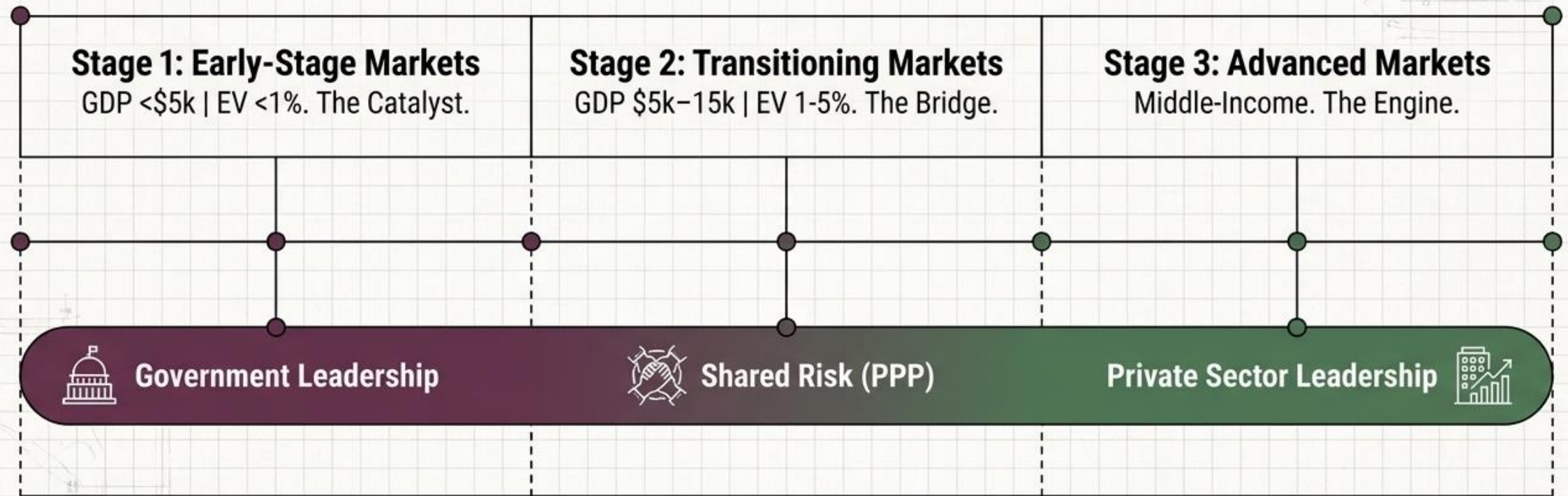
data on which partnerships or interventions yield the highest ROI when resources are constrained.

The Evidence Mirage: Academic Focus vs. Ground Truth



The Contextual Maturity Model

Stakeholder effectiveness is determined by economic context. The blueprint requires shifting leadership dynamics across three stages of market development.



Stage 1 | Early-Stage Markets

Context

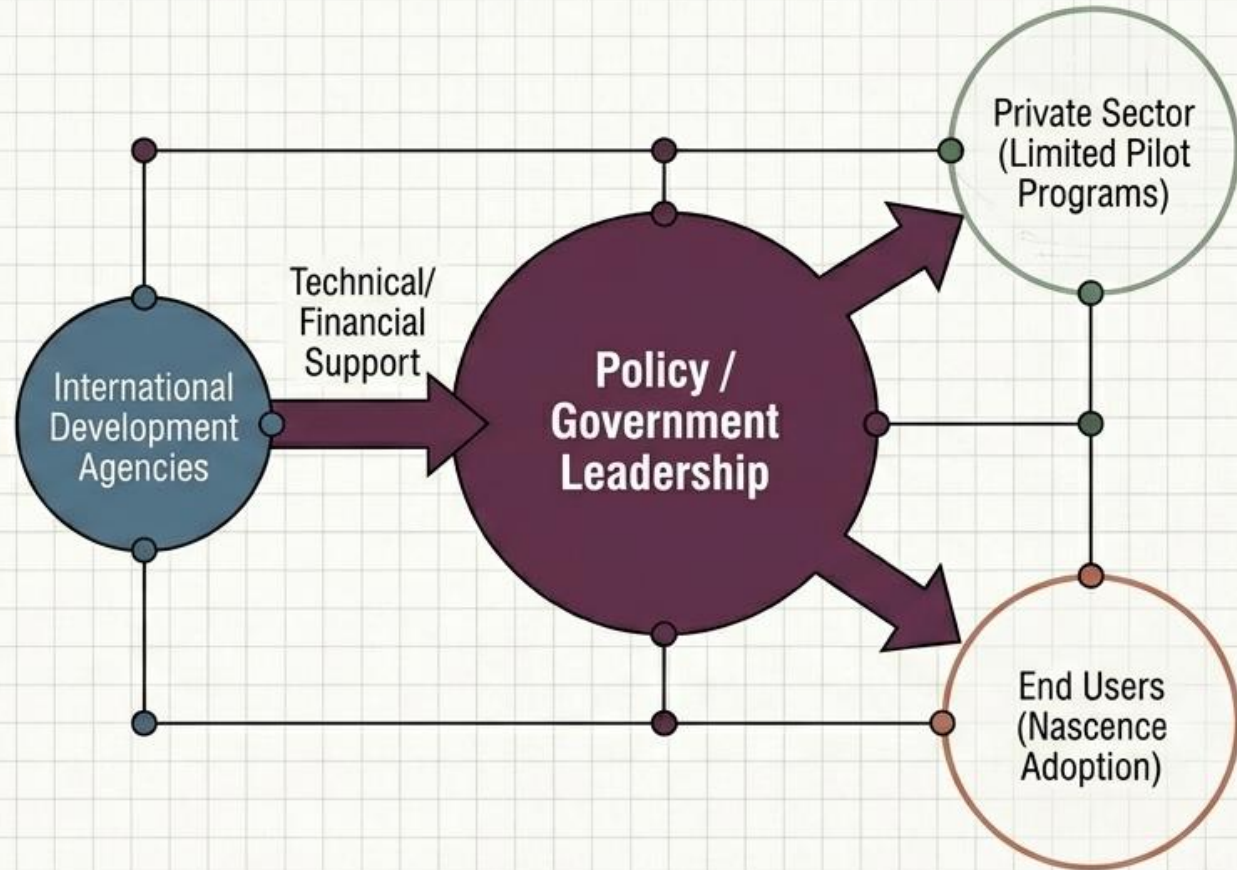
GDP <\$5k, EV <1%. E.g., Jambi City, Indonesia.

Strategy

The Government must assume primary responsibility for market creation. Private sector participation is limited to pilot programs.

Tactics

Aggressive direct subsidies, 100% public charging investment, establishing basic regulatory frameworks.



Stage 2 | Transitioning Markets

Context:

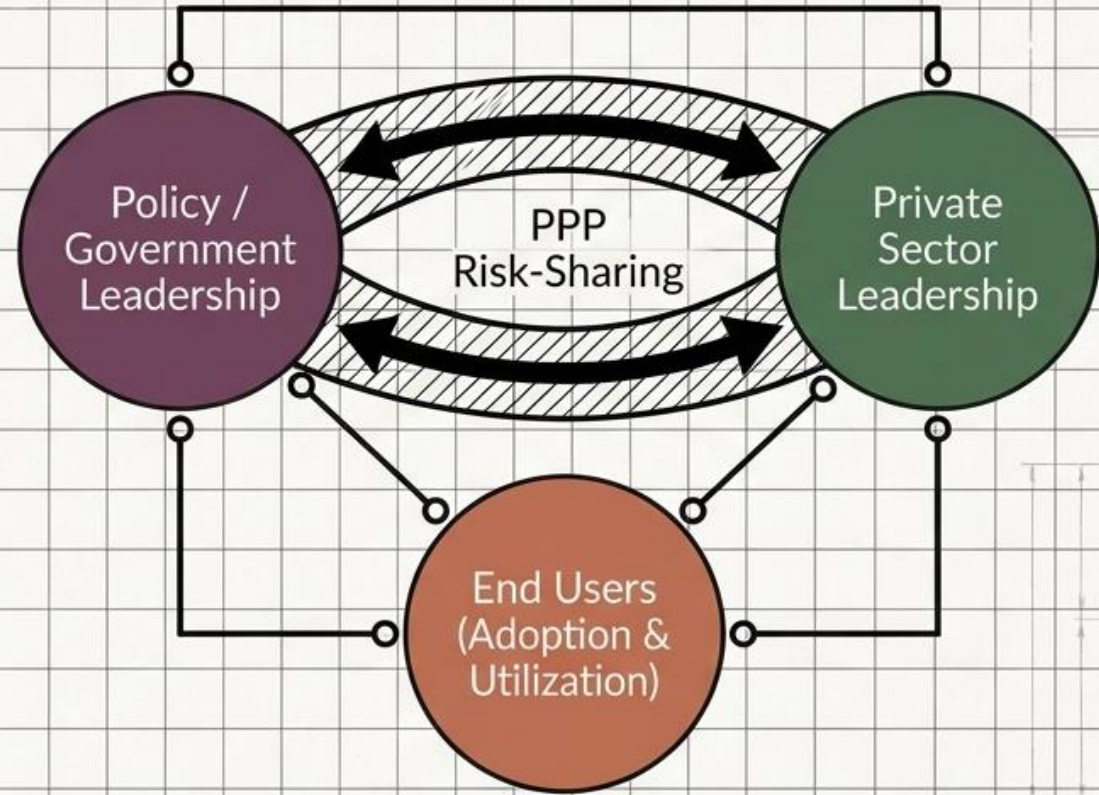
GDP \$5k-15k, EV 1-5%.

Strategy:

The era of Public-Private Partnerships (PPPs). Government shifts from direct provider to market enabler.

Tactics:

Reduced electricity tariffs for operators, coordinated standardizations, and shared infrastructure investment (e.g., Thailand's partnerships expanding chargers to malls and offices).

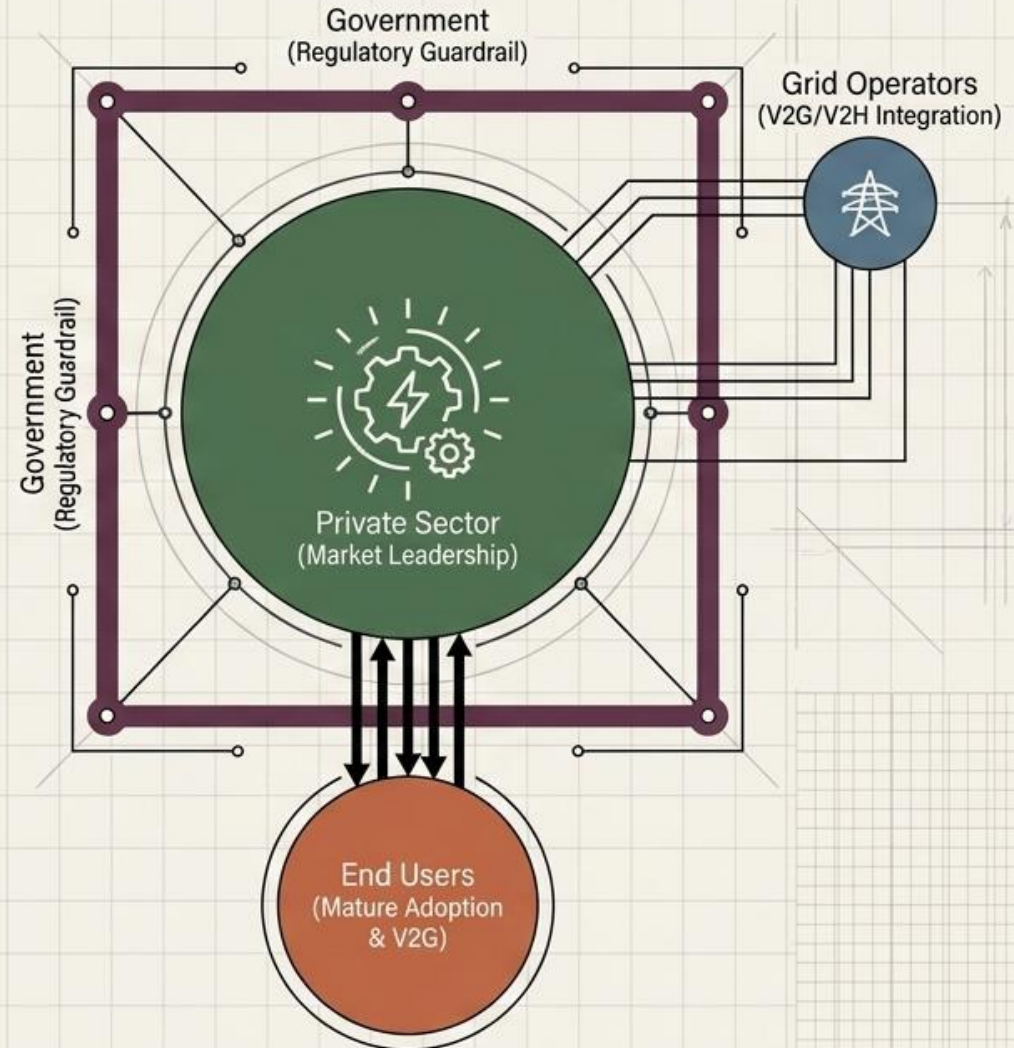


Stage 3 | Advanced Markets

Context: Middle-income status.



Strategy: Private sector leads
Strategy: Private sector leads deployment.
Government focuses strictly on grid stability, spatial equity, and regulation.

Tactics: Utilities and grid operators become the critical stakeholders (e.g., Romania exploring V2G/V2H integration to manage load). Consumer demand is driven by model diversity rather than subsidies.



The Contextual Divide: Tailoring to Vehicle Form Factors

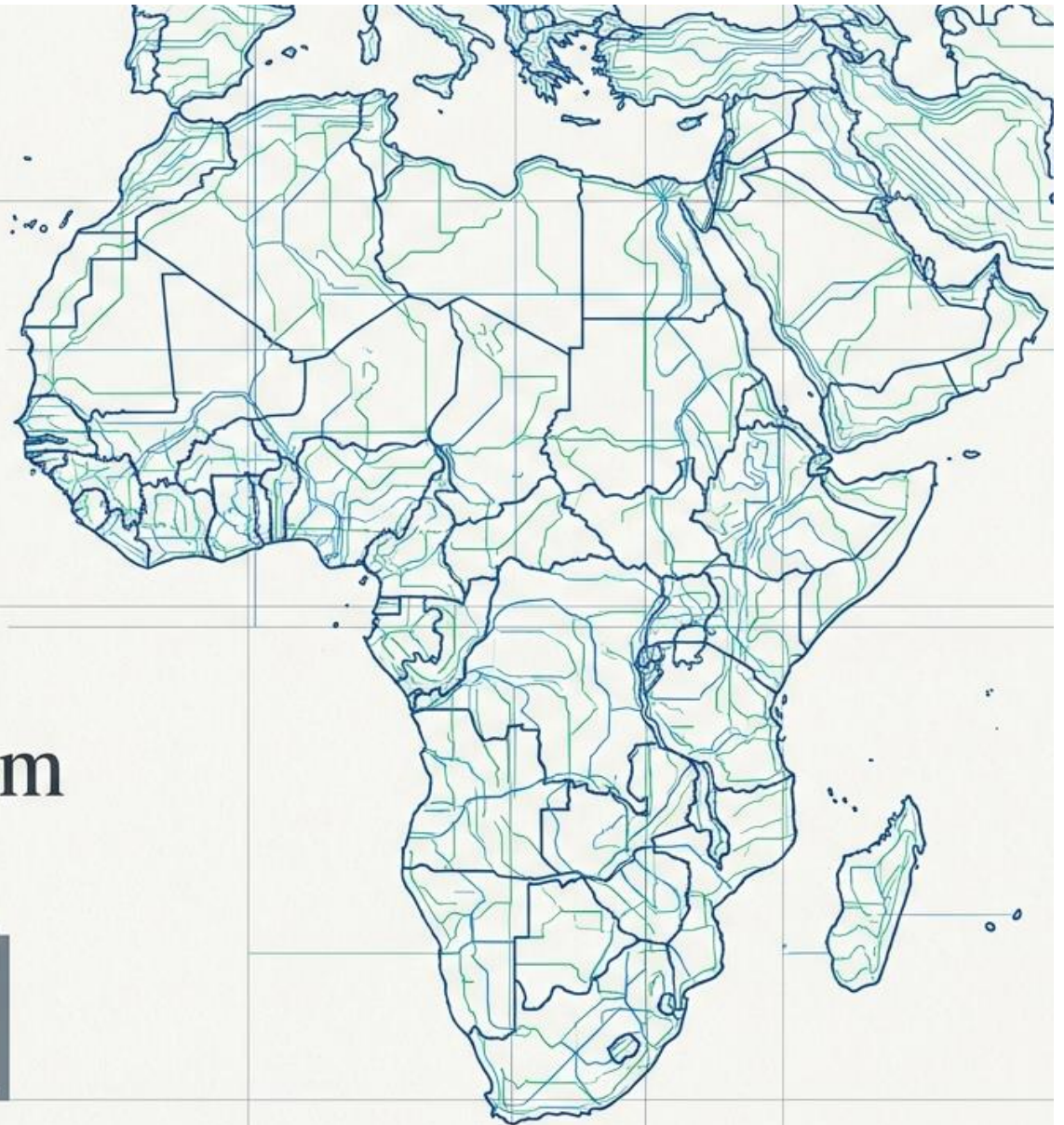
Strategies must adapt to vehicle types. Two-wheelers face affordability barriers; four-wheelers face technical barriers.

2/3-Wheelers 	4-Wheelers 
<ul style="list-style-type: none">● Dominant Barrier: Financial (High initial cost).● Key Solution: Battery swapping models to remove upfront battery costs (vital in African and Indian contexts).● Critical Actors: <u>Retailers</u>, <u>local dealers</u>, <u>swapping station operators</u>.	<ul style="list-style-type: none">● Dominant Barrier: Technical (Range, charging time, grid integration).● Key Solution: Comprehensive public fast-charging networks and smart grid management.● Critical Actors: <u>Utilities</u>, <u>heavy manufacturers</u>, <u>grid operators</u>.

POWERING THE LEAPFROG

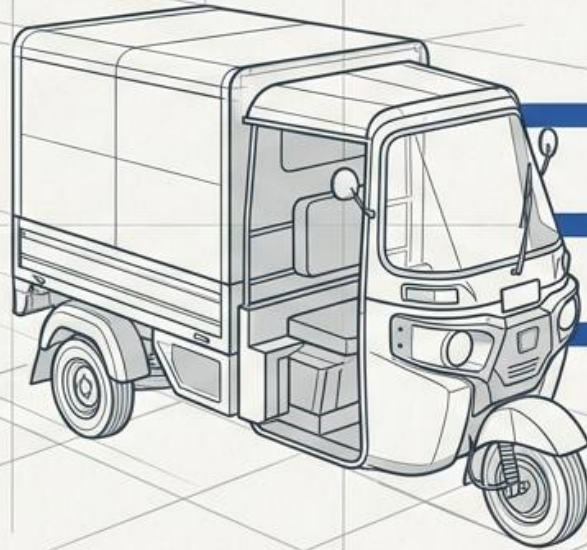
A Systemic Diagnostic of Africa's E-Mobility Ecosystem

Mapping the 4-Pillar framework required to scale
the 2W/3W electric transition across 54 nations.



The Trojan Horse for Electrification

Africa has a distinct opportunity to bypass legacy internal combustion engine (ICE) infrastructure. The transition is not being led by luxury passenger vehicles, but by the commercial backbone of urban and rural transport: the 2- and 3-wheeler segment.



38% YoY Growth

The E2W/E3W market is scaling rapidly.

30,000+ Active EVs

The current baseline of operational vehicles on the continent.

The Primary Entry Point

The most viable commercial and strategic target for scaling investment.

Continental Ambition vs. Regulatory Reality

While policy ambition is spreading, formal regulatory frameworks remain severely fragmented. A 54-country assessment reveals a massive vacuum in foundational policy.



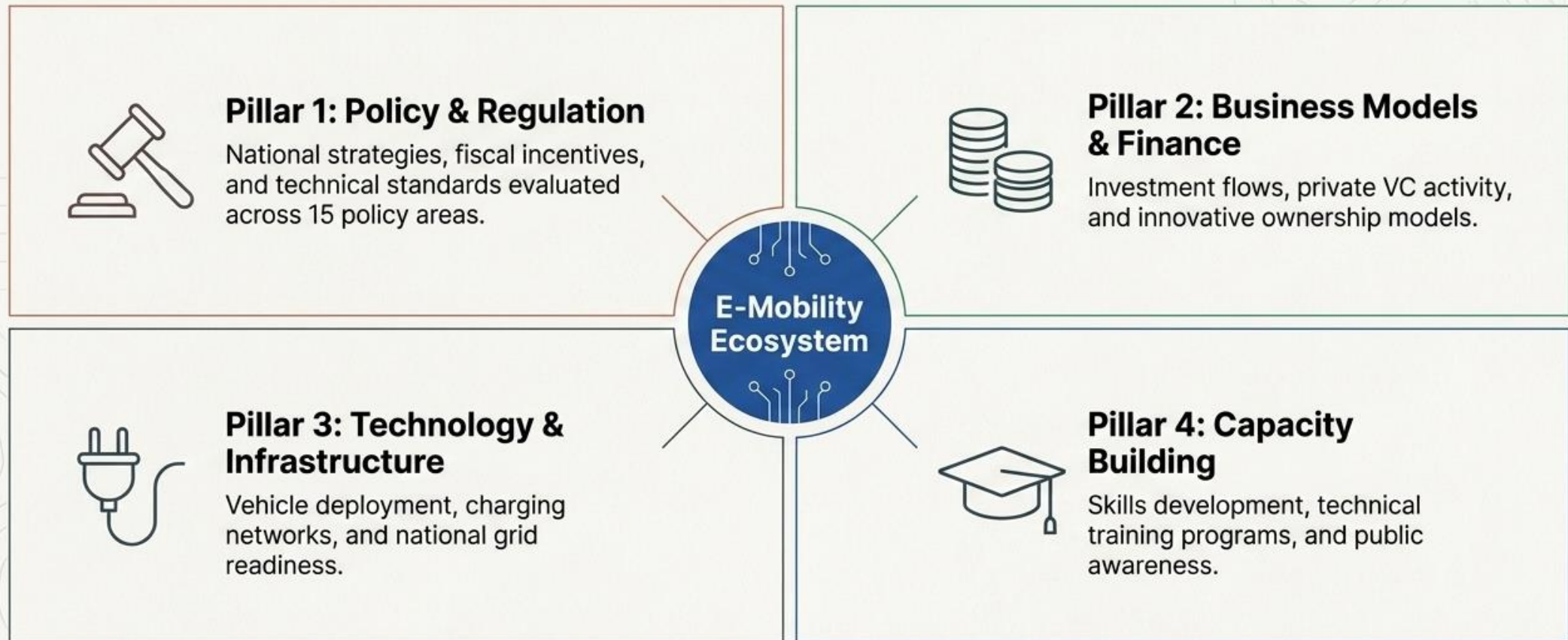
31

out of 54 African countries have absolutely zero official EV policy documents.

Without policy signals, private capital remains paralyzed, waiting for market certainty.

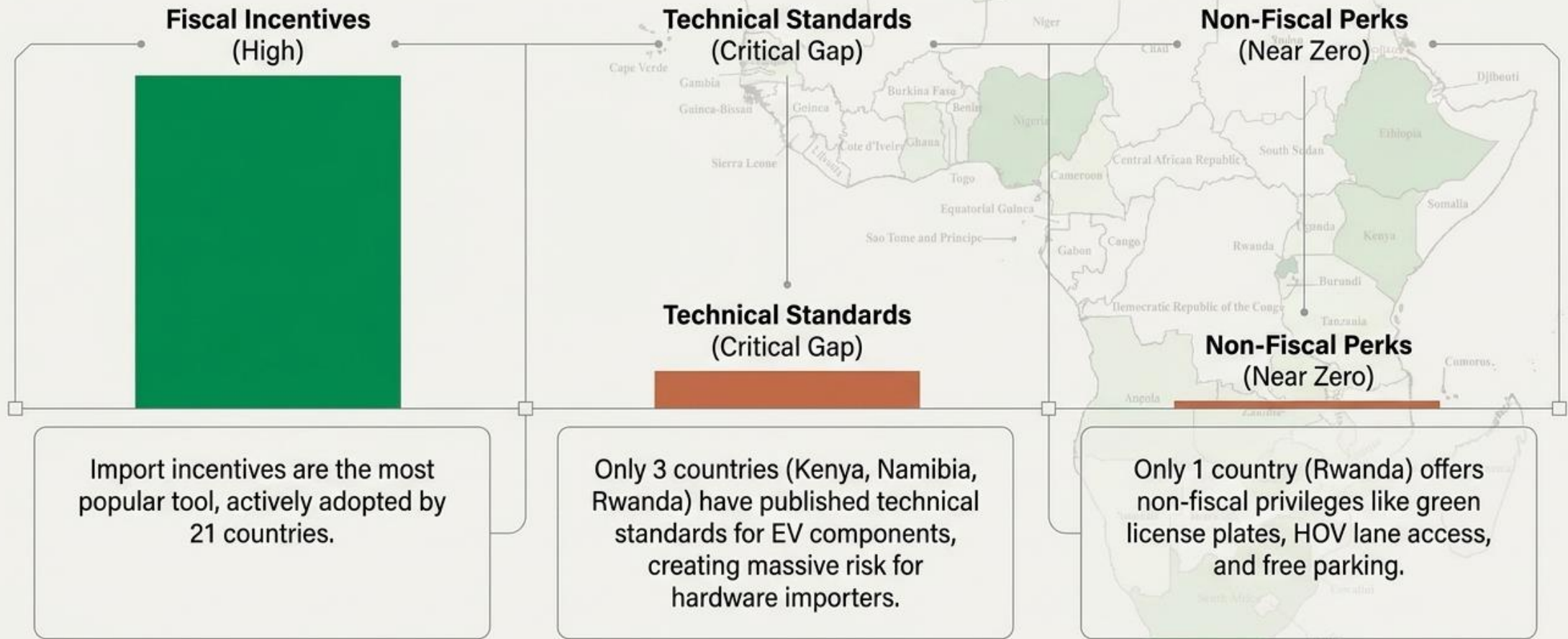
The 4-Pillar Ecosystem Diagnostic

Isolated policies fail without ecosystem support. A sustainable transition requires synchronized advancement across four interconnected pillars:



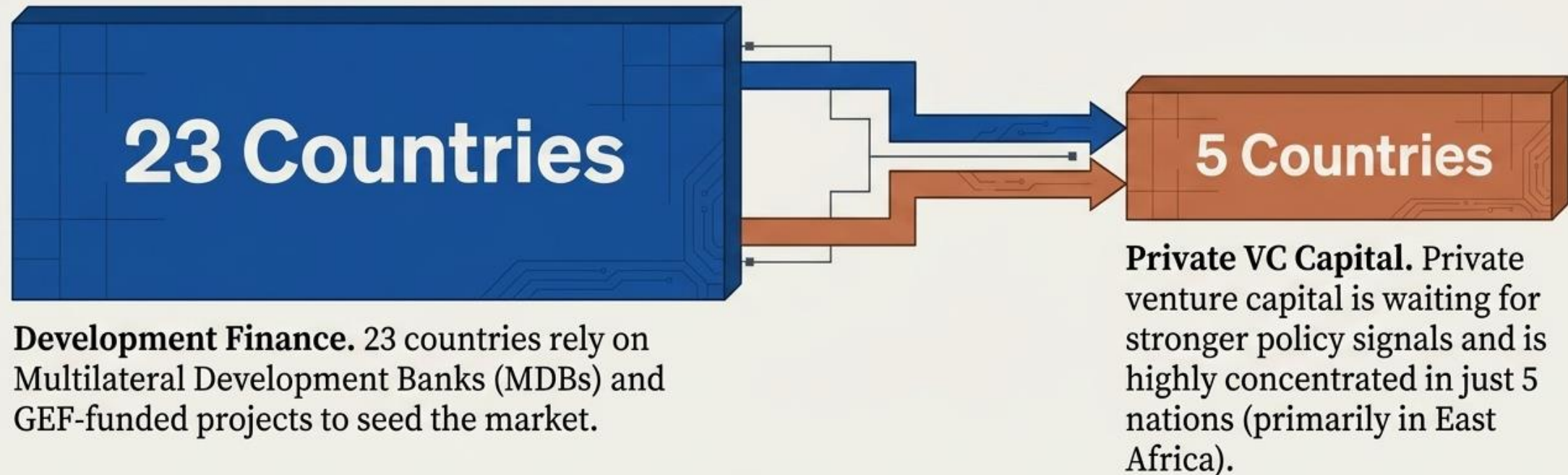
Pillar 1 | Policy is Unbalanced and Incomplete

Heavy on tax cuts, light on standards.



Pillar 2 | Finance is Stuck in the Seed Phase

The market remains highly reliant on **development funding**, indicating a nascent, high-risk phase.



Only 11 countries currently host active local assemblers, severely limiting domestic value creation and local supply chain maturity.

Pillar 3 | The Infrastructure Mismatch

Vehicle adoption is dangerously outpacing grid readiness.



12 Countries

E-bus and commercial vehicle pilot programs are documented and active.

Charging Scarcity: While South Africa leads with over 370 public chargers, major transport hubs like Nairobi had fewer than 10 as recently as 2021.



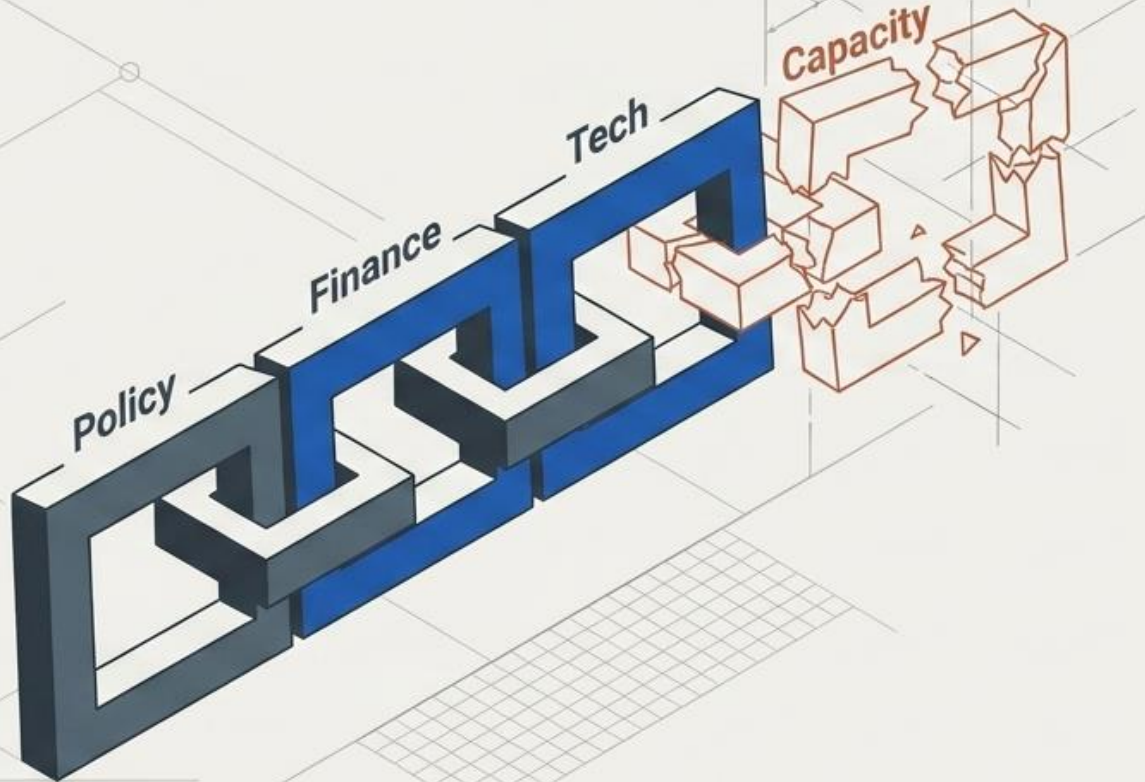
Only 8 Countries

Possess concrete grid infrastructure development plans for e-mobility.

The Deficit: Sub-Saharan Africa has a **48.4%** electricity access rate. Frequent load shedding and unstable grids undermine the total cost of ownership and the business case for EVs.

Pillar 4 | Capacity is the Breaking Point

Investment in physical assets is vastly outpacing investment in human capital.



The Data Disconnect

25 countries possess some form of e-mobility finance mechanism, but **only 12** have documented formal skills programs.

The Policy Gap

Only 3 nations (Cape Verde, Ethiopia, Rwanda) explicitly mandate workforce training in their national EV policies.

The Consequence

A **severe lack** of technical expertise for diagnostics and repair will **drive up the Total Cost of Ownership** and **destroy consumer confidence**. Isolated private efforts (e.g., Roam) exist but lack continental scale.

The Strategic Blueprint

Targeted interventions to close the ecosystem gaps

Pillar 1: Implement Innovative Fiscal Tools

Move beyond basic import tax cuts. Replicate Kenya's model of exempting locally assembled electric motorcycles from taxes to drive domestic value chains.

Pillar 2: Scale Pragmatic Infrastructure

Prioritize funding for Battery-as-a-Service (BaaS) and solar-backed microgrids over standard public fast-chargers to bypass grid fragility.

Pillar 3: Enforce ICE Phase-Outs & Standards

Implement phased restrictions on highly-polluting used ICE imports (like Egypt) and finalize technical standards to de-risk private VC investment.

Pillar 4: Institutionalize Capacity Building

Mandate technical EV training programs within national education frameworks to secure the maintenance workforce and protect consumer Total Cost of Ownership (TCO).

Driving the Future: Stakeholder Dynamics in Africa's EV Transition

Sustainable EV deployment in Africa relies on coordinated action between governments, industry, utilities, and end users. While significant barriers like grid instability and high costs persist, strategic stakeholder interventions are already proving to have transformative economic and environmental impacts across the continent.

THE BOTTLENECKS: Major Barriers to EV Deployment



Infrastructure & Grid Fragility

Inadequate charging networks and unreliable grid capacity remain consistent hurdles across African geographic contexts.

Financial Constraints & High Costs

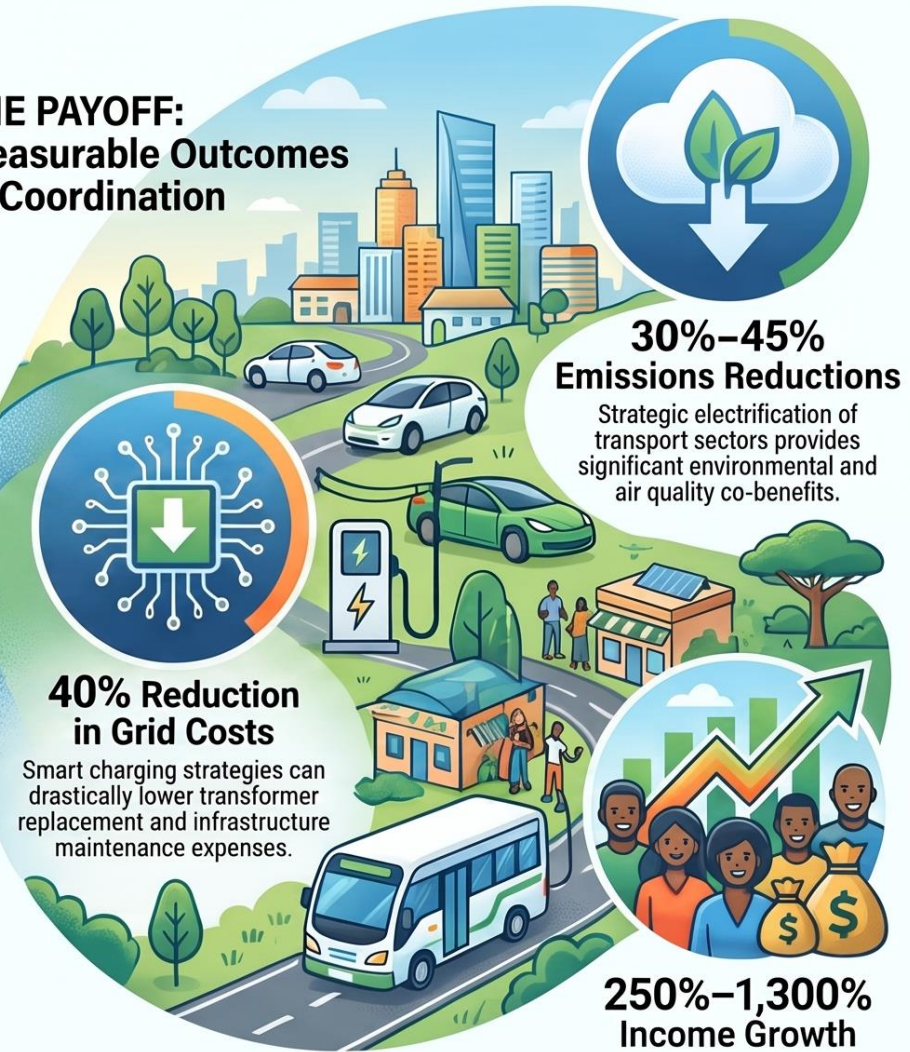
High upfront vehicle costs and limited access to credit are universal impediments to adoption.

Policy & Regulatory Gaps

Fragmented frameworks and a lack of fiscal incentives hinder institutional readiness and investment security.

STAKEHOLDER COORDINATION & ACTION

THE PAYOFF: Measurable Outcomes of Coordination



30%–45% Emissions Reductions

Strategic electrification of transport sectors provides significant environmental and air quality co-benefits.

40% Reduction in Grid Costs

Smart charging strategies can drastically lower transformer replacement and infrastructure maintenance expenses.

250%–1,300% Income Growth

Innovative business models for informal transport operators demonstrate massive potential for local economic empowerment.





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Availability of electric mobility policy and its potential for adoption in Africa

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ABSTRACT

This paper assesses the availability of policies implemented by African countries to accelerate the adoption of electric mobility. This was accomplished using a systematic review that collected and analysed policy-related documents from all 54 African countries. The documents were evaluated against a scoring framework of 15 policy areas categorised as fiscal incentives, non-fiscal incentives, administrative measures, and regulatory measures. The results indicate a shortage of electric vehicle policies, with 31 countries having official documents. Rwanda emerged as the country with the highest available policies, scoring 8 out of 10 on a normalised scale. While fiscal policies such as import tax exemptions are available in 21 countries, critical gaps in other impactful measures. For instance, direct purchase subsidies are available in only 5 countries, while non-fiscal incentives are almost entirely absent. Only three countries have established workforce training programs, and just one has mandated EV charging infrastructure through building regulations.



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Thank you!