Towards Climate-Compatible Transport Pathways in Ghana: Co-creating Future Scenarios for an Integrated and Electrified Transport System

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Key Messages

- Ghana's transport transition will depend more on institutional coordination than on technology adoption alone.
- Electrification can reduce emissions but will not resolve congestion or system fragmentation if not accompanied by governance reform.
- Public and informal transport integration remains central to mobility access in Ghana's rapidly growing cities.
- Weak governance risks producing uneven electrification outcomes and widening mobility inequalities.
- Strong governance can stabilise system performance even when electrification progresses slowly.
- Transport, energy, and urban planning must be coordinated to enable large-scale e-mobility deployment.
- Scenario planning helps identify trade-offs and uncertainties that should inform future transport modelling and policy design.

An aerial shot of the city of Accra in Ghana

Summary

In January 2026, CCG and KNUST co-convened a scenario development workshop in Accra bringing together twenty-nine participants to explore long-term pathways for Ghana's transport system. Participants from national and local government, regulatory agencies, academia, industry, transport unions, development partners, and civil society examined how Ghana's mobility system might evolve under different political, financial, and technological conditions.

This policy brief details the results from the workshop on how structural uncertainties, — governance capacity and electrification enablement —may shape Ghana's transport sector over the coming decades. The resulting scenarios contrast integrated transition futures with futures of fragmented electrification or continued fossil fuel lock-in. The scenarios demonstrate that transition in Ghana's transport sector requires coherent governance,

coordinated planning, and fiscal alignment. Adoption of new technologies without accompanying governance reform signals worsening congestion, inequality, and systemic inefficiency.

This brief provides a strategic foundation for modelling future transport pathways in Ghana and its interconnectedness to climate commitments, energy system development, and long-term economic resilience.

1. Introduction

Ghana's transport system is the backbone of everyday economic and social life, enabling access to jobs, education, healthcare, and markets across rapidly expanding cities and regions. Anchored by a vibrant informal sector[2] – comprising taxis, minibuses (trotros), motorcycles, tricycles, and autorickshaws and complemented by a gradually formalising system – the sector delivers mobility for millions of households and businesses each day [1]. Yet this hybrid structure, characterised by fragmented governance, weak institutional coordination, and uneven resourcing, remains difficult to coordinate, regulate, and integrate within long-term transport planning. Urbanisation in Ghana has accelerated in recent decades. The 2021 Population and Housing Census reports that over 56% of Ghana's population resides in urban areas, with significant concentration in the Greater Accra and Ashanti regions [3]. The Ghana Urban Transport Project illustrates earlier efforts to improve urban mobility through traffic engineering measures, management improvements, regulation of the public transport industry, and implementation of a Bus Rapid Transit system in participating metropolitan, municipal, and district assemblies [2].

Public transport provision in Ghana relies heavily on informal and semi-formal operators, including trotro services and shared taxis. Across Sub-Saharan Africa, informal systems account for the majority of urban public transport trips [4, 5]. In Ghana, these services play a critical role in maintaining mobility access, yet integration into formal planning, regulatory, and investment frameworks remain limited [5]. The National Transport Policy acknowledges the need to strengthen coordination, improve safety standards, and enhance system integration within this dual formal–informal structure [6].

At the same time, vehicle ownership has increased steadily, contributing to rising fuel demand and urban emissions. Transport accounts for approximately 23% of global energy-related CO_2 emissions, with road transport responsible for the largest share [7, 8]. Ghana's Updated Nationally Determined Contribution identifies transport as a priority mitigation sector, and includes actions related to low-carbon mobility and vehicle efficiency [9].

The electrification of vehicles is increasingly discussed as a pathway to reduce emissions and fossil fuel dependence. Ghana's Energy Transition Framework outlines ambitions to promote electric mobility as part of broader decarbonisation efforts [10]. However, international evidence indicates that electrification alone does not automatically resolve congestion, land-use inefficiencies, or inequality in access to mobility [11, 12]. Technological transition must be accompanied by institutional coordination, regulatory clarity, and integrated planning to produce system-wide benefits.

[2] In this brief, "formal" transport refers to services that are planned, regulated, or operated through public institutions. "Informal" and "semi-formal" transport refer to privately operated services, such as trotros, shared taxis, and two-/three-wheelers, that are often organised through unions or associations but whose integration into formal planning, regulatory, and investment frameworks remains limited.

Ghana's transport future, therefore, depends not only on technological adoption but also on governance capacity, fiscal stability, and alignment between transport and energy systems. Exchange rate volatility, borrowing costs, and infrastructure financing constraints influence the feasibility of large-scale electrification. Similarly, coordination between national ministries and metropolitan authorities determines whether transport reform can be implemented consistently and effectively.

This brief presents the results of a stakeholder-led scenario development process designed to explore plausible futures for Ghana's transport–energy system. The workshop was not intended to predict a single pathway or prescribe a fixed policy package. Instead, it identified key actors, structural factors, and critical uncertainties shaping the transition of Ghana's transport system, particularly around governance capacity, electrification conditions, and the integration of formal and informal transport systems. The resulting scenarios provide a strategic foundation for future transport–energy modelling and for policy dialogue on climate-compatible, inclusive, and feasible transport pathways.

2. Scenario Development: transport and energy futures in Ghana

In January 2026, CCG and KNUST co-hosted a scenario development workshop in Accra. The workshop followed a structured scenario process used in organisations' strategic planning and long-term policy analysis [13]. Scenario planning enables policymakers to examine how interacting uncertainties may shape system trajectories over time.

This structured filtering process is a core feature of scenario planning methodology [13, 14]. It prevents workshops from becoming lists of concerns and instead channels discussion toward identifying the uncertainties most likely to differentiate future pathways. The methodology was adapted from Dixon et al. [14], which draws on the scenario planning approach of Ramírez and Wilkinson [13]. This methodology is designed to build scenarios in a participatory process to inform strategic planning [13]. In recent efforts, the resulting scenarios from this process have been used to subsequently inform transport energy modelling in data scarce contexts [14].

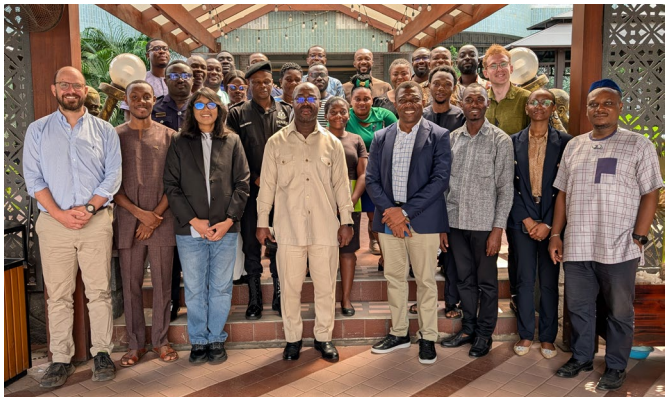
Scenario development emphasises preparing for plausible futures, especially in the case of interconnected fields like transport and energy. When used as narrative frameworks, the insights generated from the scenario processes help inform and improve quantitative modelling by identifying new variables absent from existing models, defining critical levers, and updating modelling timeframes [15].

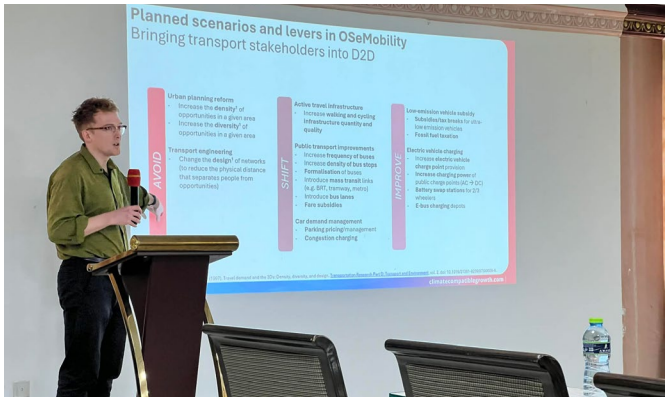
3. Scenario Development in Accra, Ghana

3.1 Stakeholder Participation

The workshop brought together twenty-nine participants representing national ministries, regulatory authorities, metropolitan and municipal assemblies, transport unions, the private sector, academic institutions, development partners, and civil society organisations. This multi-sector representation ensured that discussions reflected institutional, financial, operational, and social perspectives on Ghana's transport system.

***Figure 1:** Photos from the Accra workshop*





The workshop participants were divided into four groups based on the key actor type and the structural factors relevant to transport planning in Ghana. See **Table 1** and **Table 2** for a summary of all actors and factors identified.

***Table 1:** Identified actors*

Type of actor	Name
Government	Ministry of Energy and Green Transition (MEGT)
	Ministry of Finance
	Ministry of Environment, Science, Technology and Innovation (MESTI)
	Ministry of Transport (MoT)
	Ministry of Local Government, Chieftaincy and Religious Affairs (MLGCRA)
	Ministry of Roads and Highways, Department of Urban Roads (DUR), Department of Feeder Roads (DFR)
	Metropolitan, Municipal and District Assemblies (MMDAs)
Energy service provider	Electricity Company of Ghana Ltd
Regulatory agencies	Environmental Protection Agency (EPA)
	Energy Commission
	Public Utilities Regulatory Commission (PURC)
	Driver and Vehicle Licensing Authority (DVLA)
	National Road Safety Authority (NRSA)
	Land Use and Spatial Planning Authority (LUSPA)
	Ghana Highway Authority (GHA)
	Ghana Revenue Authority (GRA)
	Ghana Ports and Harbours Authority (GPHA)
Transport unions	Ghana Private Road Transport Union (GPRTU)
	Greater Accra Passenger Transport Executive (GAPTE)
Transport users and transport providers	Drivers, passengers, transport operators, service providers
Development finance and development partners	Development Bank Ghana (DBG)
	African Development Bank (AfDB)
	Development partners
Research and academia	Kwame Nkrumah University of Science and Technology (KNUST), Kumasi
Traditional authority	Traditional leaders

Table 2: Identified actors

Category	Factor
Socio-economic	Population growth; Social status; Growth/decline in income; Changes in education (eg affecting mobility attitude); Livelihood/employment; Land-use activities; Migration; Urbanisation; Integration of formal and informal transport; Cultural beliefs/practices; Conflicts; Safety; Education and sensitisation; Quality of life (QoL); Land use and geography
Politics and government policies	Political will; Governance; Insecurities (links to political activities); Changes in global politics; Management of infrastructure; Government policies (EV policies, transport policies, legalisation of okada); Incentives/tax reliefs for public buses and EVs; Enforcement of transport regulation
Geopolitical	Agenda shift; Regional issues; Signals to international protocols on climate change
Environmental	Seasonal changes; Floods; High temperatures; Greenery; Increased national energy demand
Financial	Subsidies; Decline in access to international finance; Resource-based finances (eg gold, oil); Increase in transport fare; Infrastructure financing (eg tolls on road network), cost of energy, exchange rate, cost of borrowing
Technological	Available modes of transport; Ride-hailing services; Provision of dedicated bus rapid transit (BRT) lanes and expressway; Efficient/ chaotic transport system; Congestion; Travel time; Infrastructure and Accessibility

This mapping exercise captured what participants identified as the most relevant actors and factors for transport planning which, while not exhaustive, served as a foundation for scenario development.

3.3 Scenario sets developed in the workshop

Participants selected two of the most critical factors to serve as the axes for their scenario sets. Based on two key factors, a 'high–low' matrix consisting of four distinct, contrasting future conditions was created [13].

The scenarios described in **Table 3** were organised within a two-by-two matrix, with each quadrant representing a distinct future trajectory.

Table 3: Summary of scenario quadrants by group

Group	Axes	Quadrant 1 (+, –)	Quadrant 2 (+, +)	Quadrant 3 (–, –)	Quadrant 4 (–, +)
Group 1	Accessibility infrastructure / road network vs Political environment and geopolitics	**Fire Fighting** – Inclusive infrastructure and affordable fares exist, but low political support leads to underutilised assets and deterioration. The system reacts to crises rather than planning	**All on Board** – Strong political will and favourable geopolitics unlock investment. Affordable fares, inclusive networks, and an integrated transport system serve all citizens with support from NGOs, unions, and the public.	**Highway to Hell** – Poor infrastructure meets a hostile political environment. Unfair transport costs, skewed networks, and misplaced priorities deepen inequality. Political instability and rising external debt follow.	**Happy Elites** – Infrastructure is inadequate for most citizens; networks are skewed and fares are high. However, the political environment is stable and orderly; it simply caters to elite interests, leaving the majority underserved.
Group 2	Education and sensitisation to transport regulation vs Government policies and int. geopolitics on climate change	**Status Quo / Go Slow (current scenario)** – Policies are supportive on paper, but without education and regulation follow-through, the system remains exclusionary and not user-friendly. Travel times increase. Interest in EVs exists, but uptake is difficult.	**Aayalolo** – Supportive policies and strong public education create an efficient, safe, and inclusive system. Reduced travel times, incentives for EVs and EV buses, and improved QoL follow.	**Agbogbloshie** – Unsupportive policies and an uninformed public produce a chaotic, congested system with increased emissions. Lawlessness spreads, energy systems strain, no EVs are adopted, and private car ownership surges.	**Ibibaza / Problems** –Public education and sensitisation are strong, but government policies are unsupportive and international climate geopolitics are unfavourable. Congestion is low because the system is well-managed locally, but persistent lawlessness, grid pressures, and energy crises cause travel delays.

Group	Axes	Quadrant 1 (+, −)	Quadrant 2 (+, +)	Quadrant 3 (−, −)	Quadrant 4 (−, +)
Group 3	Energy cost vs Integration of formal and informal transport	**Free for All** – Energy is affordable, but formal and informal transport remain fragmented and uncoordinated. Investment is low. EV uptake is limited de-spite favourable energy costs. The informal sector dominates, and QoL is low.	**All on Board** – Affordable energy and full transport integration enable a thriving system. There are incentives for local e-mobility innovation and EV uptake, less pollution, and improved QoL. Public perception of transport improves.	**Free for Some** – Expensive energy and a fragmented sector. Lowest EV uptake, highest pollution, unequal access, poor QoL, and low productivity. The system fails most people.	**Integrated Out of Reach** –Formal and informal transport are coordinated but high costs of energy prevent full integration. EV uptake is low because of costs. QoL and productivity suffer.
Group 4	Transport governance vs Population growth (resource pressure)	**We will take it like that (Yebe fa no sa aba)** – Good governance and services, improved accessible transport, reduced tax on e-mobility, decline in fossil fuel subsidies, better investments, inclusive accessible transport, EV uptake, low population growth, reduced human resources	**Utopia (Fam Fbjm)** – Strong governance channels population growth into prosperity. Improved transport management, well-tar-geted fare subsidies, better regulation, safety, integrated transport sys-tem with EVs, sustain-able transport financing, and remittance-fuelled growth because of export of skilled labour—that aids access to inter-national institutions and helps skill transfer when returning.	**Not perfect but okay (Baabi ara ne aha)** – Weak governance and low population pressure. Economic contraction reduces transport demand and supply. The system limps along without major crisis. Nature conservation gains occur, but disease risks emerge.	**Dystopia** – Poor governance meets rapid population growth. Economic breakdown, insecurity, exploitation, bad policies, arbitrary taxes, breakdown of law and order, disjointed transport, high migration, and political unrest. QoL plummets.

*Note: QoL= quality of life; EVs= Electric Vehicles

Although time constraints precluded full scenario development during the workshop, the output provides a crucial foundation for further development and for future modelling efforts.

The workshop scenarios highlight key uncertainties impacting the future of transport planning in Ghana. First, the future conditions **transport governance and geopolitics (encompassing international attention to climate change and electrification)** show that effective governance is an enabler for integrated systems, inclusive access, and improved quality of life, and that geopolitical attention to climate change and energy transitions combined with global energy prices determine financing priorities. Second, **energy affordability and reliability** are key drivers of transport modernisation and fleet electrification. Third, the **relationship between formal and informal transport systems** was reiterated as a core determinant of accessibility, total travel time, and ultimately the quality of life for residents. Finally, while **demographic pressure and urbanisation** can overwhelm institutional capacity and infrastructure investment, effective governance can transform population growth into a catalyst for investment, innovation, and remittance-fuelled economic growth.

International experience corroborates these observations highlighting institutional coherence as a prerequisite for sustainable mobility transitions [12]. Effective governance therefore functions as a system multiplier that can amplify the impact of technological and financial interventions.

Similarly, global evidence indicates that rapid EV adoption is associated with coherent policy frameworks, financial incentives, and infrastructure coordination [7]. In the absence of such conditions, electrification could stay niche with continued reliance on fossil fuels.

4. Linking scenarios to modelling

To define the modelling levers, we selected Group 2 and 3 scenarios as the most detailed and policy-relevant exploration of transport electrification dynamics and their intersection with the regulatory context in Ghana. The scenarios from Group 2 provide a detailed exploration of the policy, regulatory, and educational dimensions. The scenarios from Group 3 focus on the economic and structural dynamics that define electrification investment.

In addition, the Ministry of Transport was consulted for their insights and for determining their policy priorities in relation to the scenarios. From this consultation, and based on the workshop outcomes, a final set of scenarios was developed.

4.1 Scenario Matrix

Informed by the critical uncertainties identified during workshop discussions and Ministry of Transport consultations, the matrix shown in **Figure 2** was constructed around two intersecting axes: the strength of governance and transport system integration, and the enabling conditions for electrification. It is therefore a post-workshop synthesis rather than a direct reproduction of any single group matrix in Table 3. Groups 2 and 3 were particularly important for identifying the modelling-relevant issues of electrification, regulation, energy affordability, and formal–informal transport integration, while scenario names from across the workshop outputs were retained where they best represented the situations described in the final matrix.

Figure 2: *Ghana Scenario Matrix: Governance Strength vs Electrification Enablement*

Feasibility considerations

The feasibility of these scenarios depends on the interests and capabilities of different actors. Scenarios characterised by greater integration, namely "All on Board/Aayalolo" and "Integrated Out of Reach/Ibibaza", are likely to require stronger coordination among ministries, metropolitan authorities, regulators, transport operators, energy providers, and development partners.

Key enablers include policy continuity, finance, grid readiness, and the inclusion of informal and semi-formal operators in reform processes. By contrast, fragmented scenarios such as "Free for All/ Sɛnea ɛte ara" and "Highway to Hell/ɛnkɔ yie koraa" may emerge where market-led adoption, weak coordination, limited finance, or resistance from affected operators prevent system-wide integration.

5. Translating Scenarios into Modelling Levers

Scenario modelling involves identifying the policy and system levers implied in each scenario and mapping them to modelling parameters. These levers serve as modelling inputs that are meant to represent outcomes of policy decisions, institutional coordination, and technological adoption. Examples include vehicle electrification rates, charging infrastructure deployment, public transport integration, and vehicle ownership trends.

***Table 4:** Scenario Levers for Translating Scenarios into Transport Model Inputs*

Scenario	Scenario factors	Policy/system lever	Modelling variable
All on Board 'Aayalolo'	Coordinated government strategy supporting electrification	Strong EV policy incentives	EV adoption rate
	Expansion of charging infrastructure along urban corridors	Accelerated infrastructure investment	Charging station density
	Electrification of public and commercial fleets	Fleet electrification programmes	Share of electric buses and commercial vehicles
	Integration of informal transport into regulated systems	Public transport system reform	Public transport coverage and reliability
	Improved institutional coordination	Coordinated infrastructure planning	Network efficiency and travel time reliability
Free for All 'Sɛnea ɛte ara'	Private-sector-driven electrification	Market-led EV adoption	EV share concentrated in private vehicles
	Fragmented governance and weak regulation	Limited public transport reform	Public transport integration index
	Uneven infrastructure deployment	Spatially uneven charging infrastructure	Charging infrastructure distribution
	Informal sector excluded from electrification policies	Limited integration of paratransit	Informal transport share
Highway to Hell 'ɛnkɔ yie koraa'	Weak governance and limited infrastructure investment	Low infrastructure investment rate	Road network capacity growth
	Lack of electrification policies	Slow or negligible EV adoption	EV share in fleet
	Growth in fossil fuel vehicle ownership	Increasing car ownership	Vehicle ownership per household
	Expansion of informal transport without coordination	Fragmented public transport system	Service reliability and accessibility
Integrated Out of Reach 'Ibibaza'	Strong governance and planning coordination	Public transport system integration	Service efficiency and coverage
	Limited electrification due to financial and energy constraints	Slow EV adoption	EV fleet share
	Urban planning coordination improves mobility management	Improved network planning	Congestion levels
	Gradual infrastructure improvements	Moderate infrastructure investment	Network capacity growth

For instance, strong governance coordination may translate into improved public transport integration and infrastructure investment rates, while favourable electrification conditions influence the rate of electric vehicle adoption and charging infrastructure expansion.

Each scenario reflects a change in institutional conditions or infrastructure development that alters key parameters in a transport system model. For example, policies that introduce EV incentives translate into higher electric vehicle adoption rates, while improvements in institutional coordination affect the integration and operational reliability of public transport services. Infrastructure investment phases influence network capacity and charging availability, while vehicle ownership trends affect transport demand and congestion levels. The modelling levers therefore represent the mechanisms through which the qualitative scenario narratives influence system dynamics within transport models.

6. Policy Implications

Transport infrastructure in Ghana's major cities is increasingly strained by worsening congestion and emissions caused by rapid urbanisation accompanied by expanding motorisation and vehicle ownership. Electrification presents a critical opportunity, but outcomes depend on governance quality, policy coordination, and inclusion of the informal transport sector, which dominates mobility. Therefore, Ghana should prioritise institutional strengthening and regulation at the national and subnational levels, intermodal integration, and inclusive electrification of public and informal transport, cross-sector coordination between mobility, energy, and urban planning and affordable energy provision to achieve equitable, low-emission urban mobility.

The scenarios do not prescribe a single preferred pathway. Rather, they point to cross-cutting policy implications that could improve preparedness across different transport futures. These include the following:

- **Integrated Cross-Sector Governance for Sustainable Transport:** Establish and strengthen transport-focused cross-sector coordination among transport, energy, fiscal, land-use, and spatial planning institutions. This coordination is critical to improving system-wide efficiency, aligning investments and policies, and accelerating the transition to clean and sustainable transport energy.
- **Cross-sector coordination for integrated, multimodal public transport:** Align transport-related ministries and stakeholders to deliver coherent policies that prioritise high-quality public transport and seamless connections between buses, rail, non-motorised transport, and emerging electric mobility. To anchor this coordination, Ghana should establish well-resourced metropolitan transport authorities with clear legal mandates to plan, regulate, and integrate public transport infrastructure, services, fares, and operations across large urban areas. Empowered authorities can align investment decisions, reduce fragmentation across modes and operators, and ensure that electrification of public transport translates into reliable, affordable, and inclusive urban mobility at scale. This can shift transport use away from private vehicles and deliver system-wide efficiency and climate benefits.
- **Prioritise integration and electrification of public transport:** Since technology-led EV transition is unlikely to result in system efficiency, electrification should be seen as an opportunity to pursue industry transformation

and integration that actively includes informal transport operators to secure buy-in and system-wide impact.

- **Focus on public and commercial fleets first:** Electrify buses, taxis, and high-use commercial vehicles to maximise emissions reductions, reliability, and equity benefits, while providing training and transition support for existing operators to support uptake and reduce resistance.
- **Deliver integrated and equitable charging and transport infrastructure:** Integrate infrastructure, power distribution, transport services, and tariff design across cities to maximise equity and improve system reliability. In parallel, develop equitable charging infrastructure by strategically expanding charging networks along major urban corridors and across metropolitan areas, ensuring consistent access and preventing uneven distribution of benefits between cities and communities.
- **Link urban planning and transport reform:** Integrate land-use planning, public transport regulation, and service restructuring to reduce congestion and improve reliability.
- **Address energy affordability and financing:** Improve energy affordability through targeted tariff design, off-peak charging incentives, and sustainable financing mechanisms to make large-scale electrification viable and resilient over time.

7. Conclusion

Ghana's transport future is likely to be shaped by more than technology adoption. While electrification presents clear opportunities for emissions reduction and energy diversification, its success depends on institutional coordination, regulatory clarity, and financial alignment.

The resulting scenarios, both from the workshop and the final version revised with inputs from the Transport Ministry, offer a shared reference point for ongoing dialogue, examining trade-offs, identifying priority reforms, and aligning transport ambition with institutional capacity.

References

[1] Sturgess, D., Mitullah, W., Msoni, M., Chivunga, J., Dzisi, E., Morrissey, H., Boateng, F., Nkurunziza, A., Agbevivi, D., Kadewa, W., and Pierard, E. (2024). *Transport-energy modelling in sub-Saharan Africa: innovations and opportunities to support informed policymaking towards equitable, clean access for all.* DOI: https://doi.org/10.5281/zenodo.14042944

[2] Ghana - *Ghana Urban Transport Project : P100619 - Implementation Status Results Report : Sequence 16 (English)* (2015). World Bank Group. Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/460801468283129380 [Accessed: 31 May 2026].

[3] Ghana Statistical Service (2021). *2021 Population and Housing Census General Report*. Accra. Available: https://census2021.statsghana.gov.gh [Accessed: 31 May 2026].

[4] Kumar, A. and Barrett, F. (2008). *Africa Infrastructure Country Diagnostic. Stuck in traffic: Urban transport in Africa*. AICD Background paper, 1. Available at: https://documents1.worldbank.org/curated/en/671081468008449140/pdf/0Urban1Trans1FINAL1with0cover.pdf [Accessed: 31 May 2026].

[5] Behrens, R., McCormick, D., and Mfinanga, D. (eds) (2016). *Paratransit in African cities. Operations, regulation and reform*. London: Routledge. DOI: https://doi.org/10.4324/9781315849515

[6] Ministry of Transport (2020). *National Transport Policy.* Available at: https://www.mot.gov.gh/files/resources/National_Transport_Policy.pdf [Accessed: 31 May 2026].

[7] IEA (2023). *Global EV Outlook* 2023, IEA, Paris. DOI: https://doi.org/10.1787/cbe724e8-en.

[8] World Health Organization. (n.d.). *Health risks. In Transport.* Available at: https://www.who.int/teams/environment-climate-change-and-health/healthy-urban-environments/transport/health-risks [Accessed: 5 March 2026].

[9] Government of Ghana (2021). *Updated Nationally Determined Contribution under the Paris Agreement (2020-2030).* Available at: https://mesti.gov.gh/documents/ghanas-updated-nationally-determined-contribution-unfccc_2021/ [Accessed 31 May 2026].

[10] Ministry of Energy (2022). *Energy Transition Framework (2022-2070).* Available at: https://powerlibrary.theelectricityhub.com/2024/05/06/ghana-energy-transition-framework/ [Accessed: 31 May 2026]

[11] IPCC (2022). *Climate Change 2022: Mitigation of Climate Change.* Working Group III. DOI: https://doi.org/10.1111/padr.12632

[12] World Bank (2021). *Transforming Transportation 2021: Reimagining Safe and Resilient Mobility for Recovery.* Available at: https://www.transformingtransportation.org/2021 [Accessed: 31 May 2026]

[13] Ramírez, R., & Wilkinson, A. (2016). *Strategic Reframing: The Oxford Scenario Planning Approach.* Oxford University Press. DOI: https://doi.org/10.1093/acprof:oso/9780198745693.001.0001

[14] Dixon, J., Pierard, E. C., Mwanzia, P., Giki, P., Oduor, J., Maranga, I., ... & Hirmer, S. A. (2024). *How can emerging economies meet development and climate goals in the transport-energy system? Modelling co-developed scenarios in Kenya using a socio-technical approach.* Energy strategy reviews, 53, 101396. DOI: https://doi.org/10.1016/j.esr.2024.101396

[15] Pierard, E., Msoni, M., Mutuwa, J., et al., (2026). *Future Scenarios for Transport and Energy Transitions in Zambia: Participatory Scenarios for Policy and Planning,* CCG Policy Brief. Available at: https://climatecompatiblegrowth.com/wp-content/uploads/Future-Scenarios-for-Transport-and-Energy-Transitions-in-Zambia.pdf [Accessed: 31May 2026].

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