ENERGY & NATURAL RESOURCES

27th April 2026



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ENERGY DIVERSIFICATION: SYNCHRONIZING CNG AND EV INFRASTRUCTURE FOR ROBUST GLOBAL SUPPLY CHAINS[1]

1. Introduction

The global transportation sector is currently undergoing a phase change, navigated by the urgent dual imperatives of decarbonization and energy security. As the environmental toll of traditional internal combustion engines becomes increasingly untenable, the industry is pivoting toward a diversified fuel landscape. Central to this transition are **Compressed Natural Gas (CNG)** and **Electric Vehicles (EVs)** two distinct yet complementary pathways aimed at reducing the country's long-standing reliance on petroleum. The **Petroleum Industry Act (PIA) 2021** and the **Electricity Act 2023** are the primary laws that govern this policy direction of infrastructural development in the Energy Sector in Nigeria supported by subsidiary regulations.

While EVs represent the long-term vision for zero emission mobility, CNG serves as a critical, high-efficiency bridge, particularly for heavy-duty transit and markets with existing gas networks. However, the viability of these technologies does not rest solely on the vehicles themselves, but on the robustness of the physical and digital infrastructure supporting them. From the rapid expansion of charging grids in Norway to the strategic CNG corridors of India and China, the race to build "fuelling stations of the future" is on.

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This article examines the current state of CNG and EV infrastructure, analysing how shifting policy frameworks, falling battery costs, and strategic capital investments are reshaping the way the world moves. By exploring the unique economic hurdles such as high upfront CAPEX and the necessity for grid modernization, we highlight the collaborative efforts required between public and private sectors to drive a sustainable transport revolution.

2. CNG Infrastructure

As cities worldwide confront intense pollution levels and the rising cost of traditional fuels, **CNG** has emerged as a frontline solution. Composed primarily of methane and stored at high pressure, CNG is not just an alternative; for many urban canters, it is becoming the standard for sustainable transport.

The primary draw of CNG lies in its chemical simplicity. Unlike complex long-chain hydrocarbons found in petrol and diesel, methane combusts with remarkable efficiency. This translates to a massive reduction in the "urban mix" of pollutants:

a. **Near-Zero Particulate Matter (PM):** CNG eliminates the thick, black soot commonly seen from diesel exhausts, directly combatting respiratory illnesses like asthma and bronchitis.

b. **Lower Nitrogen Oxides (NOx):** By slashing NOx emissions, CNG helps prevent the formation of ground-level ozone and the heavy smog that often blankets dense traffic zones.

c. **Reduced Carbon Monoxide (CO):** Cleaner combustion makes congested intersections and tunnels significantly safer for pedestrians and commuters.

While private cars are adopting CNG, the real impact is felt in **high-mileage sectors**. Given that buses, taxis, and auto-rickshaws operate almost 24/7, switching them to CNG creates an immediate, measurable improvement in roadside air quality, this is due to the fact that CNG is mostly methane, the simplest hydrocarbon. Unlike petrol or diesel, it is already a gas, so it mixes perfectly with air and burns almost completely inside the engine.[2]

This clean combustion improves the air along busy roads in four ways:

[2] Yakub Hammed, 'Compressed Natural Gas (CNG) As an Alternative Fuel to Premium Motor Spirit (PMS): The Benefits and Disadvantages' (SPA Ajibade & Co 6 January, 2025), <https://spaajibade.com/wp-content/uploads/2024/12/compressed-natural-gas-cng-as-an-alternative-fuel-to-premium-motor-spirit-pmS.pdf> accessed on 30 May, 2026.

a. **No Black Smoke:** It produces virtually zero soot or fine particulate matter eliminating the thick, visible smog that hangs around traffic.

b. **Less Toxic Gas during Traffic:** When idling in traffic jams, gasoline engines release high levels of carbon monoxide. CNG keeps these toxic emissions extremely low.

c. **Fewer Chemical Irritants:** It reduces nitrogen oxide emissions, preventing the formation of throat-irritating ground-level ozone.

d. **No Sulphur or Benzene:** CNG is naturally free of lead, benzene, and sulfur, removing dangerous, cancer-causing chemicals from the streets.

Many municipal authorities around the world have already mandated CNG for public fleets, recognizing that a single CNG bus can replace the high emissions of an older diesel counterpart while offering a quieter, smoother ride. Furthermore, the commercial logistics sector delivery vans and freight carriers is pivoting toward CNG to balance corporate sustainability goals with the bottom line.

Beyond the environmental "green," there is the financial "green." For the daily commuter or fleet manager, CNG offers two distinct advantages:

a. **Cost Efficiency:** On a per-kilometre basis, CNG remains significantly cheaper than liquid fossil fuels.

b. **Engine Longevity:** Because it burns cleanly, it leaves fewer carbon deposits. This results in less wear and tear, potentially extending the life of the engine and reducing long-term maintenance costs.[3]

The transition to a CNG-powered city is not without its hurdles. The success of the fuel depends on a robust **City Gas Distribution (CGD)** network. The Challenges are high upfront vehicle costs, longer refuelling times compared to petrol, and the need for rigorous safety checks on high-pressure cylinders remain valid concerns.[4]

However, India and other rapidly developing nations are closing these gaps through aggressive infrastructure expansion. Digital mapping now makes finding a station easy, and the integration of **Bio-CNG** (methane derived from organic waste) is turning existing pipelines into conduits for truly renewable energy. While the world looks toward a future of electric and hydrogen-powered transport, CNG serves as the

[3] Yakub Hammed, 'Compressed Natural Gas (CNG) As an Alternative Fuel to Premium Motor Spirit (PMS): The Benefits and Disadvantages' (SPA Ajibade & Co 6 January, 2025) <https://spaajibade.com/wp-content/uploads/2024/12/compressed-natural-gas-cng-as-an-alternative-fuel-to-premium-motor-spirit-pmS.pdf> accessed on 30 May 2026.

[4] Indian Oil-Adani, 'The Role of CNG in Reducing Urban Pollution' <https://ioagpl.com/the-role-of-cng-in-reducing-urban-pollution/> accessed on 18 March 2026.

essential "here and now" solution. It is a scalable, affordable, and infrastructure-ready fuel that allows cities to breathe easier today while building the renewable networks of tomorrow.

2.1 Growing Adoption of CNG as Cleaner Alternative to Diesel and Petrol

The African automotive sector is undergoing a profound transformation as nations pivot toward CNG and Liquefied Petroleum Gas (LPG). This shift is not merely an environmental gesture but a robust economic strategy aimed at reducing reliance on traditional liquid fossil fuels. As of 2024, the Africa CNG and LPG vehicle market was valued at **USD 1.28 billion**, with projections suggesting a rise to **USD 1.9 billion** by 2029 representing a steady Compound Annual Growth Rate (CAGR) of **6.78%**.[5]

While the market is in its nascent stages, a "pioneer effect" is taking hold. Strategic regulatory frameworks and aggressive infrastructure investments are creating attractive opportunities for investors and energy stakeholders alike.

2.1.1 Regional Leaders and Policy Frameworks

Across the continent, several nations have emerged as frontrunners, utilizing policy incentives to accelerate the transition:

2.1.2 Egypt: The Regional Hub

Egypt has solidified its position as a continental leader in the manufacturing and servicing of gas-powered vehicles. The government has implemented a rigorous conversion target of 2,600 vehicles per month, supported by specialized financing options designed to lower the barrier to entry for commercial and private owners.[6]

2.1.3 Nigeria: Ambitious Decarbonization

With a bold target to convert one million vehicles to CNG by 2025, Nigeria is focusing on scale. The initial phase involves deploying 11,500 CNG buses and 55,000 conversion kits. Complementing this gas-led strategy, the government is also planning a network of 50 Electric Vehicle (EV) charging stations across major urban hubs like Lagos, Abuja, and Port Harcourt.[7]

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5 Solomon Ekanem, '6 Countries Championing CNG Transition in Africa' <https://africa.businessinsider.com/local/markets/6-countries-championing-cng-transition-in-africa/c9jz2tp> accessed on 18 March 2026.

6 Ibid.

7 Ibid.

CNG is processed natural gas compressed to high pressures to serve as vehicular fuel. Therefore, every stage of the Auto-CNG supply chain triggers section 125[8] licensing requirements:

a. **Gas Processing & Compression:** Establishing or operating a facility that takes pipeline natural gas and compresses it to CNG requires a license under section 125(1)(a) of the PIA.

b. **Bulk Storage & Transportation:** Transporting CNG via virtual pipelines (compressed gas trucks/skids) to refuelling stations requires a bulk transportation or storage license.

c. **Retail Gas Operations:** Building and operating Auto-CNG retail refuelling stations or integrating CNG dispensers into existing retail outlets is a downstream activity requiring a retail/distribution license under this section.

d. **No Regulatory Oversight:** The NMDPRA has no legal authority to license EV charging infrastructure, electric vehicle battery manufacturing, or EV imports under section 125.

e. **The Gas-to-Power Intersect:** Section 125 indirectly impacts the EV market through the power sector. If an independent EV charging hub installs a gas-fired captive power plant (using natural gas/CNG generators to bypass grid instability), the construction, processing, or wholesale supply of the gas powering those chargers will trigger section 125 licensing compliance.

Section 126 also empowers the NMDPRA to issue specific regulations to govern the technical, commercial, environmental, and safety aspects of licensed gas activities.

This section provides the legal right for the NMDPRA to regulate the emerging Auto-CNG market. The authority utilizes section 126[9] to enforce:

a. **Safety and Technical Standards:** Enforcing codes for high-pressure CNG storage vessels, dispensing pressures, and conversion kit installations to prevent hazardous failures.

b. **Open Access and Tariffs:** Regulating the commercial tariffs for gas transportation networks to ensure that downstream CNG providers can access natural gas molecules at non-discriminatory, competitive prices.

8 See, *Petroleum Industry Act* 2021.
9 Ibid.

c. **Market Anti-Competitiveness:** Preventing dominant gas suppliers from hoarding molecules or fixing prices that could choke out independent third-party CNG retailers.

2.1.4 Morocco: Integrating Gas and Renewables

Morocco's strategy is part of a broader mandate to achieve a **52% renewable energy mix** by 2030. Specifically for the transport sector, the government has launched a grant-backed initiative to transition **10,000 taxis** to CNG by 2025, leveraging private-public partnerships to ensure infrastructure readiness.[10]

2.1.5 South Africa: Diversifying the Fleet

Already a leader in electric mobility, South Africa is simultaneously expanding its CNG footprint to lower municipal costs. Johannesburg's Metrobus fleet now operates over **150 CNG-powered buses**, a move that serves the dual purpose of reducing carbon emissions and insulating public transport from volatile fuel prices.[11]

2.1.6 East African Expansion: Kenya and Tanzania

a. **Kenya:** The government is prioritizing urban air quality by launching pilot projects to convert Public Service Vehicles (PSVs) to CNG.

b. **Tanzania:** To solve the challenge of gas accessibility, the Tanzanian government is investing approximately **14 billion** in a "mother station." This central hub will serve as a distribution point for smaller daughter stations across regions currently lacking direct gas access.[12]

The momentum behind the African CNG market is fuelled by three primary factors:

a. **Economic Resilience:** CNG offers a significantly lower price point compared to petrol and diesel, providing a buffer against global oil market fluctuations.

b. **Environmental Mandates:** As nations strive to meet international climate goals, gas serves as a critical "bridge fuel" in the transition away from heavier hydrocarbons.

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10 Ibid.
11 Ibid.
12 Ibid.

c. **Governmental De-risking:** Through tax breaks, conversion subsidies, and direct infrastructure investment, African governments are actively reducing the risk for private investors.

The trajectory is clear: Africa's transition to CNG is no longer a peripheral trend but a central pillar of the continent's industrial and environmental evolution.[13]

2.2 Technical Sanction and Safety Enforcement: Analysing NEMSA's Inspectorate Mandate Over EV Infrastructure Under Section 176

a. **Section 176(1)(e): Enforcement of Technical Standards**[14]

Section 176(1)(e) empowers NEMSA to: *"enforce compliance with technical standards and specifications for all electrical installations, electrical plants... electric networks and connectivity to the grid."* Commercial EV charging docks are highly demanding "electrical installations" that connect directly to the grid or independent mini-grids. Under this subsection, NEMSA is legally mandated to ensure that the physical EV charging equipment, cables, and dispensers meet strict national technical specifications before they are deployed.

b. **Section 176(1)(f): Safety Requirements for Construction and Maintenance**[15]

This section mandates NEMSA to *"enforce compliance with safety requirements for construction, operation and maintenance of... distribution networks and electric installations."* High-voltage fast chargers carry significant fire, shock, and grid-overload risks. This subsection gives NEMSA the power to audit the construction, ongoing operations, and maintenance protocols of EV hubs to protect consumers and property from electrical accidents.

c. **Section 176(1)(l): Technical Inspections in Hazardous Locations**[16]

This provision explicitly empowers NEMSA to *"test and certify electrical installations in hazardous locations such as in filling stations..."*. As Nigeria pushes forward with the co-location of clean energy infrastructure, many EV

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13 Solomon Ekanem, '6 Countries Championing CNG Transition in Africa', <https://africa.businessinsider.com/local/markets/6-countries-championing-cng-transition-in-africa/c9jz2tp> accessed on 18 March 2026.

14 Electricity Act 2023.

15 Ibid.

16 Ibid.

charging ports are being built inside existing conventional petrol stations or alongside Compressed Natural Gas (CNG) dispensers. Because filling stations are legally classified as "hazardous locations," NEMSA uses this subsection to strictly inspect and certify that the high-voltage EV chargers are safely isolated from highly combustible fuel zones.

2.3 CNG Infrastructure Expanding in Other Countries

The Strategic Surge of India's CNG Market: Driving Toward a $48 Billion Future.

The landscape of India's energy sector is undergoing a rapid transformation, with CNG emerging as a cornerstone of the nation's transition toward sustainable mobility. Valued at USD 27.7 billion in 2024, the India CNG market is projected to skyrocket to USD 48.45 billion by 2030, maintaining a robust Compound Annual Growth Rate (CAGR) of 13.30%.[17]

This growth is not merely a statistical shift but a reflection of a nationwide pivot toward cleaner, cost-efficient, and domestically supported fuel alternatives.

A primary catalyst for this expansion is the aggressive development of refuelling infrastructure. As of early 2026, India has established over 8,600 CNG stations, significantly reducing the "range anxiety" that previously hindered adoption.

a. Public-Private Synergy: Substantial investments from both the government and private entities like GAIL, Adani Total Gas, and Reliance are expanding pipeline networks into Tier-2 and Tier-3 cities.

b. Target 2030: The government remains committed to its goal of 18,000 operational stations by 2030, ensuring that CNG is no longer restricted to metro hubs but is accessible across the country's vast highway networks.[18]

3. Regulatory Pathways for EV Infrastructure: Licensing Exemptions, Tariffs, and Safety in Nigeria

i. Section 34: General Licensing Powers of NERC[19]

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17 Global News Wire, 'India CNG Industry Research Report 2024: $ 48.45 Bn Market Trends, Regional Insights, Competitive Landscape, Forecasts and Opportunities 2020-2030' <https://www.globenewswire.com/news-release/2024/10/22/2967118/28124/en/India-CNG-Industry-Research-Report-2024-48-45-Bn-Market-Trends-Regional-Insights-Competitive-Landscape-Forecasts-and-Opportunities-2020-2030.html> accessed on March 25, 2026.

18 Global News Wire, 'India CNG Industry Research Report 2024: $ 48.45 Bn Market Trends, Regional Insights, Competitive Landscape, Forecasts and Opportunities 2020-2030' <https://www.globenewswire.com/news-release/2024/10/22/2967118/28124/en/India-CNG-Industry-Research-Report-2024-48-45-Bn-Market-Trends-Regional-Insights-Competitive-Landscape-Forecasts-and-Opportunities-2020-2030.html> accessed on March 25, 2026.

19 See, *Electricity Act* 2023.

Section 34(2) empowers NERC to license and regulate the **supply and trading** of electricity. NERC uses this window to regulate commercial charging tariffs, ensuring that what operators charge EV owners per kilowatt-hour aligns with national tariff methodologies.

ii. **Section 63: Licensing Exemptions (For Small-Scale EV Charging Hubs)**[20]

Section 63(1) & (2) permits the generation of electricity up to 1 Megawatt (MW) in aggregate at a site, or the distribution of electricity up to 100 Kilowatts (kW) in aggregate, without requiring an explicit license from NERC. This means small to medium scale EV charging stations can operate quickly under a simpler permit or registration system rather than navigating full utility licensing.

iii. **Section 63(2)(b): Captive Generation (For Large-Scale EV Charging Hubs)**

This section allows for **Captive Generation** power generated entirely for your own consumption (in this case, to feed your charging docks) with no upper limit, subject to obtaining a captive generation permit from NERC.

iv. **Section 165: Promotion of Renewable Energy and Energy Efficiency**[21]

This forms the statutory foundation for **solar-powered EV charging hubs**, allowing developers to lean on renewable energy incentives and frameworks provided by the Act.

While the **Electricity Act 2023** lacks an explicit textual mention of electric vehicles, the regulatory oversight of EV charging infrastructure is implicitly captured under Section 63 (governing licensing exemptions for generation under 1MW and distribution under 100kW) and s**ection 34** (granting NERC the power to regulate commercial supply and retail tariffs). Furthermore, technical and safety compliance for the physical charging assets falls under the electrical installation inspectorate mandates administered by Nigerian Electricity Management Services Agency (NEMSA).

3.1 China's Dominant EV Empire

[20] Ibid.
[21] Ibid.

China continues to be the undisputed engine of the electric revolution. In 2024, the nation accounted for **65% of global EV sales**, with electric models making up nearly half of all domestic car purchases.

Several factors underpin China's lead:

a. **Price Parity:** In a significant market shift, over 50% of EVs sold in China are now cheaper than their internal combustion engine (ICE) counterparts.

b. **Strategic Investment:** The Chinese government has funnelled approximately **$30billion** into EV production.

c. **Incentive Programs:** A robust 2024 trade-in scheme and the extension of EV tax exemptions through 2027 have maintained high consumer demand. Analysts predict China could reach an **80% EV market share by 2030**.[22]

3.2 Battery Costs Falling, Making EVS More Competitive

The global energy landscape is witnessing a transformative shift as the battery industry enters a high-growth phase defined by record-breaking deployment and a dramatic collapse in pricing. According to the International Energy Agency's (IEA) latest 2025 analysis, the industry has crossed a critical psychological and economic threshold: the average cost of an electric vehicle (EV) battery pack has officially dropped below $100/kWh.

This pricing milestone is widely considered the "tipping point" where electric vehicles achieve direct cost parity with traditional internal combustion engine vehicles, signalling a new era for sustainable transportation.

The rapid decline in costs is not the result of a single factor, but rather a convergence of market forces and technological breakthroughs:

a. Plummeting Raw Material Costs: Lithium prices have seen a staggering retreat, falling more than 85% since their peak in 2022.

b. Economies of Scale: Global manufacturing capacity reached 3 TWh in 2024. With announced projects, this capacity could triple within the next five years.

c. Technological Standardization: The industry is moving toward standardized manufacturing processes and a preference for Lithium Iron Phosphate (LFP)

[22] Ibid.

chemistries, which are significantly more cost-effective than traditional Nickel Manganese Cobalt (NMC) alternatives.

China continues to dominate the sector, producing over 75% of the world's batteries. In 2024 alone, Chinese battery prices fell by nearly 30%, driven by deep supply chain integration and fierce domestic competition.

In response, other regions are aggressively scaling their own ecosystems:

a. United States: Manufacturing capacity has doubled since 2022, bolstered by federal tax credits. Currently, nearly 700 GWh of additional capacity is under construction.

b. Europe: Despite challenges including the high-profile bankruptcy of Northvolt the European Commission recently unveiled a €1.8 billion action plan to secure raw material supply chains. Partnerships, such as the Stellantis-CATL joint venture, are also working to bring affordable LFP technology to European shores.

c. Emerging Hubs: Countries like Indonesia (nickel-rich) and Morocco (phosphate-rich) are becoming vital strategic partners in the global supply chain.[23]

While costs fall, the technology itself is becoming more sophisticated. TotalEnergies recently debuted a "world first" in battery thermal management: an immersion-cooled battery integrated into a mass-market Renault Mégane E-Tech. By submerging cells in a specialized dielectric fluid, the system allows for faster charging and improved safety without increasing vehicular weight.[24]

3.3 Navigating Critical Challenges: Addressing the Structural Hurdles to EV Adoption

For EVs to achieve total market penetration, the industry must address four primary challenges that currently contribute to consumer hesitation.

a. **The Standardization Gap**

A fragmented ecosystem of plug types and varying charging speeds remains a primary frustration for drivers. To mitigate this, the **International**

[23] Energy Institute "Boom time for batteries as industry sees falling prices and soaring demand", (12 March 2025) <https://knowledge.energyinst.org/new-energy-world/article?id=139441> accessed on 30 March 2026.

[24] Energy Institute "Boom time for batteries as industry sees falling prices and soaring demand", (12 March 2025) <https://knowledge.energyinst.org/new-energy-world/article?id=139441> accessed on 30 March 2026.

Electrotechnical Commission (IEC) has championed the **IEC 61851 standard**. By establishing a universal language for charging hardware, this framework ensures cross-manufacturer compatibility, reducing "plug anxiety" for consumers and lowering the risk for infrastructure investors.

b. **Bridging the Range and Speed Divide**

Although battery technology is improving, "range anxiety" the fear of being stranded remains a psychological barrier for long-distance travel. The industry's answer lies in **Ultra-Fast Charging**. Systems like Tesla's Supercharger network, capable of adding 200 miles of range in roughly 15 minutes, are effectively redefining the road trip, making electric travel as viable as its gasoline-powered counterparts.

c. **Capital Constraints and High Entry Costs**

The hardware and installation costs for high-speed charging stations remain significant. To lower this barrier, governments are deploying aggressive fiscal tools. In the United States, for instance, federal tax credits cover up to **30% of equipment costs**, incentivizing private enterprises to build out the networks necessary for a nationwide transition.

d. **Expanding the Infrastructure Footprint**

Current charging density still pales in comparison to the century-old network of petroleum stations, particularly in rural corridors. Strategic mandates, such as the European Union's pledge to install **one million public charging points by 2025**, are essential to ensuring that no geographic region is left behind in the green transition.[25]

3.4 Unlocking Value: Emerging Opportunities within the Global EV Charging Market

Beyond solving existing problems, the EV charging sector is a fertile ground for high-tech innovation and new business models.[26]

3.5 CNG and EV Infrastructure Require Strategic Investments: Nigeria's New Clean Mobility Roadmap

Nigeria has reached a decisive turning point in its transportation history with President Bola Tinubu's recent expansion of the Presidential Initiative on Compressed Natural

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[26] Injet 'Challenges and Opportunities for the EV Charging Industry', (6 March 2023) <https://www.wyevcharger.com/knowledge/challenges-and-opportunities-for-the-ev-charging-industry/> accessed on 30 March 2026.

Gas (PiCNG). By formally incorporating EVs into the program's mandate now rebranded as the Presidential Initiative on Compressed Natural Gas and Electric Vehicles (PiCNG & EV) the administration is signalling a shift toward a diversified, low-carbon transport ecosystem.

However, moving from policy to nationwide adoption requires more than just administrative approval; it demands massive, well-coordinated strategic investments in infrastructure.

The rebranding of PiCNG & EV represents a holistic approach to Nigeria's energy transition. By leading and coordinating a national strategy that covers both gas-driven and electric mobility, the initiative aims to reduce the country's dependence on traditional liquid fuels. Under the leadership of Executive Chairman, Ismael Ahmed, the mandate is clear: accelerate deployment and ensure affordability.

The immediate focus remains on scaling the "Mother and Daughter" station model and Integrated Refuelling Units. Because permanent infrastructure takes time to build, the President has directed the rapid deployment of Mobile Refuelling Units (MRUs). These mobile stations serve as a critical bridge, providing immediate access to CNG while long-term facilities are under construction.

Strategic investment in this area includes:

a. Mother Stations: Large-scale facilities connected to gas pipelines that compress natural gas.

b. Daughter Stations: Smaller, satellite stations that receive gas via mobile trailers to serve more remote areas.

c. Conversion Ecosystems: Establishing a nationwide network of centres where vehicle conversion kits can be installed professionally.[27]

4. Collaboration Needed Between Governments and Private Sectors

In the modern economic landscape, the traditional divide between state responsibility and private enterprise is rapidly dissolving. At the heart of this shift is the **Public-Private Partnership (PPP)**, a sophisticated collaborative framework designed to finance, construct, and manage projects that serve the collective interest. By merging the regulatory authority of the public sector with the technical agility and capital of the

[27] Arise News, 'Tinubu expands CNG initiative to include electric vehicles, boosting clean transport, lowering costs, and improving nationwide energy access' <https://www.arise.tv/tinubu-expands-cng-initiative-to-include-electric-vehicles-in-nationwide-clean-transport-drive/> accessed on 30 March 2026.

private sector, these alliances are becoming the blueprint for sustainable infrastructure and service delivery.[28]

5. Conclusion

The transition to a sustainable transport ecosystem is no longer a choice between two competing technologies, but a strategic synchronization of **CNG** and **EVs**. As this analysis has demonstrated, the path to a decarbonized future is a "dual-track" journey where CNG serves as the immediate, high-efficiency bridge for heavy-duty logistics and emerging markets, while EVs establish the long-term blueprint for zero-emission urban mobility.

The convergence of falling battery costs now crossing the critical **$100/kWh** threshold and the aggressive expansion of CNG corridors in industrial giants like India and China proves that the global supply chain is rapidly maturing. However, for this transition to reach its full potential in regions like Africa and Southeast Asia, the focus must shift from vehicle sales to **infrastructure resilience**.

The "fuelling stations of the future" will not be defined by a single energy source, but by a diversified network of high-capacity charging grids, smart gas distribution hubs, and renewable energy integration.[29]

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[28] UNESCO, 'Public-private Partnerships', <https://www.unesco.org/en/dtc-finance-toolkit-factsheets/public-private-partnerships> accessed on 30 March 2026.

[29] EV24, 'Nigeria's National Action Plan: EV Tax Breaks to 2025 Launch', (2 July 2025) <https://www.ev24.africa/nigerias-national-action-plan-ev-tax-breaks-to-2025-launch/#:~:text=The%20plan%20outlines%20specific%20eligibility,take%20advantage%20of%20these%20savings.> accessed on 30 March 2026.