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Developing Nigeria's EV Charging Infrastructure

How policy and finance can support reliable infrastructure build-out

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28 August 2026

Authors and Acknowledgments

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Suggested Citation

Monkgogi Buzwani, Kelly Carlin, Samhita Shiledar, and Ridwan Zubair, *Developing Nigeria's EV Charging Infrastructure*, RMI, 2026, https://rmi.org/resources/developing-nigerias-ev-infrastructure/.

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Acknowledgments

The authors would like to thank David I. David of the Clean Technology Hub and Umar Muhammed of the Nigerian Electricity Regulatory Commission for offering valuable inputs through peer review.



The authors would also like to thank the Drive Electric Campaign for the generous support that made this report possible.

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Executive Summary

Nigeria's growing electric mobility market is creating an increasingly important need for charging and battery-swapping infrastructure. The country had an estimated 20,000 EVs by the end of 2025, with adoption emerging across two- and three-wheelers, commercial fleets, ridehailing vehicles, and other segments. As this transition accelerates, infrastructure deployment will need to keep pace: by 2040, Nigeria could require approximately 15,000 public chargers and battery-swapping installations with requirements rising substantially over the following decades.

Meeting this need will require comprehensive frameworks combining policy and financing pathways (Exhibit 1) that can reduce deployment costs, improving project bankability and ultimately ensuring that infrastructure is available where and when it is needed. These interventions will need to evolve alongside the market, supporting early deployment while creating the conditions for increasing levels of commercial investment over time.

Exhibit 1: Policy and financing solutions to scale EV charging infrastructure in Nigeria



Source: RMI analysis

A clear policy framework can accelerate and guide market development. A clear national roadmap can support that growth by aligning infrastructure deployment with expected EV demand, priority locations, and grid requirements. Supporting policies can then address specific market barriers: targeted capital incentives and preferential tariffs can reduce infrastructure and operating costs; land concessions and streamlined development processes can improve access to viable sites; and common technical and interoperability standards can provide the foundation for a safe, reliable, and scalable network.

Financing solutions will need to complement these policies by addressing the risks that prevent otherwise viable projects from attracting capital:

- Demand- and revenue-based contracts and charging-as-a-service models can create more predictable cash flows and reduce up-front investment requirements for users.
- Catalytic capital and viability-gap funding can support projects through early commercial gaps.
- Credit guarantees and risk-sharing facilities can improve access to commercial debt.

As operators establish larger portfolios and stronger operating records, pooling and project-finance structures can unlock longer-term capital, while public-private partnerships can combine public support with private investment and delivery for strategically important infrastructure.

Delivering this transition will require coordinated action across federal and state governments, regulators, utilities, charging operators, vehicle and fleet providers, site owners, commercial lenders, and development-finance institutions, with each playing a distinct role in creating the market. With the right policy foundations, financing mechanisms, and institutional coordination in place, Nigeria can translate its growing electric mobility momentum into a charging ecosystem that is reliable, accessible, commercially sustainable, and capable of supporting EV adoption at scale, strengthening its position as a leading electric mobility market in Africa.

Market Context

As Africa's most populous country and one of its largest vehicle markets, Nigeria has the potential to become one of the continent's largest electric mobility markets. Its large and growing urban population, extensive road transport market, and high volumes of commercial and high-utilization vehicle activity create a strong foundation for electrification. The transition to electric mobility is also central to Nigeria's broader climate and development objectives. Nigeria has committed to achieving net-zero emissions by 2060, and its Energy Transition Plan (ETP) identifies transport electrification as a key pathway for decarbonizing the transport sector.[1] The ETP envisions widespread adoption of electric vehicles across transport modes over the coming decades, alongside investments in charging infrastructure and other policy and financial measures needed to enable the transition.

While EV adoption remains nascent, the market is gaining momentum across multiple vehicle segments. As adoption increases, the availability of reliable and fit-for-purpose charging and battery-swapping infrastructure will become increasingly important to sustaining this growth. Developing infrastructure in-step with vehicle adoption will be critical to supporting commercially viable EV operations and ensuring that charging availability does not become a constraint as the market scales.

Existing EV infrastructure and charging ecosystem

Nigeria's charging and battery-swapping ecosystem is currently at an early stage, with most visible deployment concentrated in major urban markets, particularly Lagos and Abuja, alongside emerging activity in other states and pilot locations. Infrastructure is being developed through a mix of government and research pilots, fleet- and vehicle-provider-led charging, dedicated charging operators, and battery-swapping networks serving primarily electric two- and three-wheelers (E2Ws and E3Ws).

Two patterns stand out:

- **Battery-swapping is expanding for E2Ws and E3Ws:** Battery-swapping networks serving E2Ws and E3Ws have expanded across several locations with over 120 stations now in operation.[2] Swapping is particularly suited to high-utilization commercial vehicles because it allows depleted batteries to be exchanged within minutes, minimizing vehicle downtime. It also enables batteries to be charged separately from vehicle operations, providing flexibility in when and how electricity is sourced.
- **Solar and storage are emerging as important design features:** Given the cost and reliability challenges associated with electricity supply in parts of Nigeria, some operators are integrating on-site solar generation and battery storage into charging depots and swapping facilities. These systems can supplement grid electricity, improve infrastructure availability and resilience to grid outages, and reduce reliance on expensive backup generation.

Infrastructure technology

Plug-in charging and battery-swapping are emerging as the two primary EV charging models in Nigeria, with the appropriate technology depending on vehicle characteristics, operating patterns, and charging needs. Plug-in charging supplies electricity directly to a vehicle's installed battery through a physical connection to a charger, while battery-swapping replaces a depleted removable battery with a charged one and recharges the depleted battery separately for subsequent use. Battery-swapping is particularly suited to vehicles with smaller, removable batteries and high utilization, while plug-in charging can serve a wider range of vehicle segments through private, shared, depot, and public charging configurations.

E2Ws are well suited to battery-swapping, given their relatively small and often removable battery packs, along with the importance of minimizing downtime for high-utilization vehicles. E3Ws can be served through battery-swapping or depot charging, depending on battery configuration and operating model. Commercial electric four-wheelers (E4Ws), including logistics and ridehailing vehicles, can rely on a combination of fleet/depot and public charging, while private E4Ws can use home, workplace, destination, and public charging. Electric buses typically rely on depot or terminal charging, creating larger but geographically concentrated electricity loads (Exhibit 2).

Exhibit 2: Primary charging model by vehicle segment

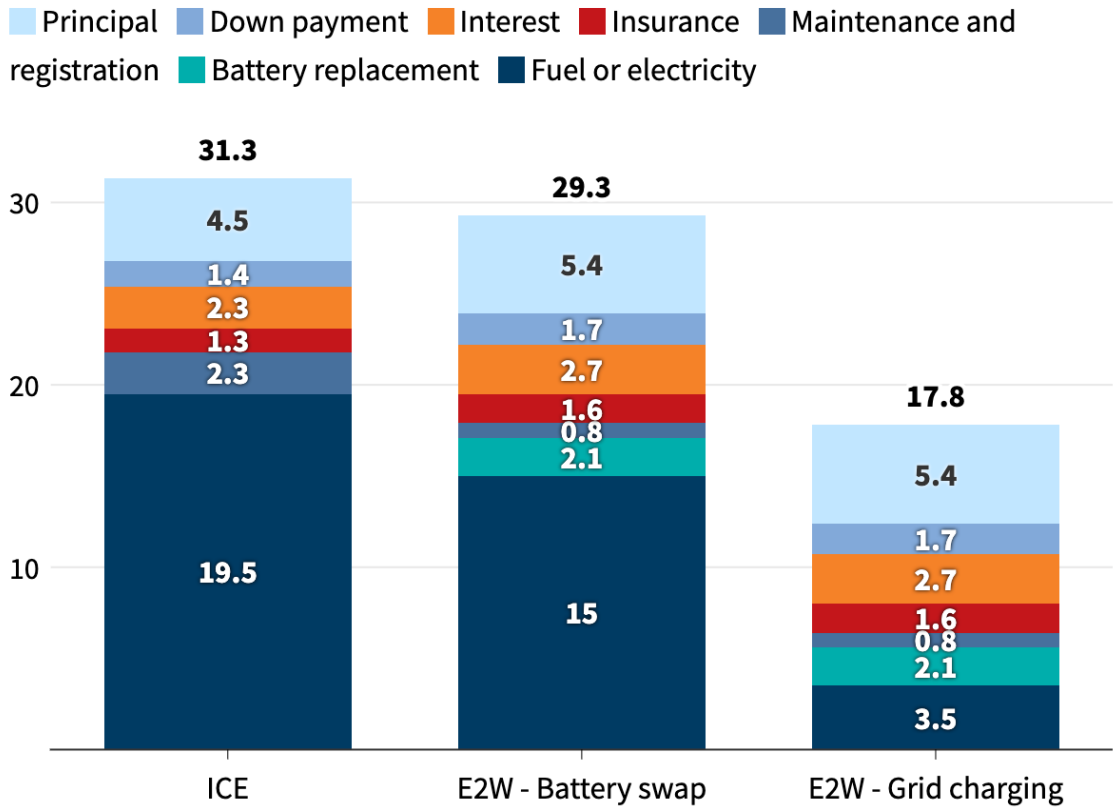
Vehicle segment	Primary charging model
E2W	Battery-swapping
E3W	Battery-swapping and depot charging
Commercial E4W	Fleet or depot charging
Private E4W	Home, destination, and public charging
Electric buses	Depot or terminal charging

Despite the higher capital cost of EVs, E2Ws have a lower total cost of ownership (TCO) than their internal combustion engine (ICE) counterparts. This is mainly driven by lower energy and maintenance costs relative to ICE vehicles. However, the magnitude of this advantage depends significantly on how the vehicle is charged and energy costs.

The choice of charging method has a decisive effect on TCO. Vehicles sold under a swapping model can have a lower purchase price because the battery is typically owned by the swapping provider rather than purchased with the vehicle. However, the user pays a higher recurring energy or swapping charge. As a result, E2Ws retain a TCO advantage over their ICE equivalents, but battery swapping raises the cost of energy roughly fourfold, narrowing that advantage from 44% to roughly 8%.

Charging costs are also sensitive to the source and cost of electricity. Grid tariffs, on-site solar and storage, and backup generation can result in different delivered energy costs, which ultimately affect vehicle TCO. The economics of EV adoption therefore depend not only on vehicle costs, but also on the charging model and the cost of providing reliable electricity.

Exhibit 3: Total cost of ownership comparison of commercial 2W using different charging technologies (NGN/km)



Swap pricing is implied from per-swap fees divided by pack size, so it bundles battery ownership, station capex and margin rather than representing an electricity tariff, as plug-in charging does.

Source: Spiro, Bajaj, Fueltracker, RMI analysis and stakeholder interviews, Nigeria Bureau of Statistics and Nigeria Electricity Regulatory Commission

Types of EV charging infrastructure

Nigeria's charging ecosystem is developing across several infrastructure and business models, reflecting differences in vehicle use, customer needs, and charging demand. These models also manage utilization risk differently, with some infrastructure serving captive or high-utilization users and others relying on demand from the broader EV market.

Infrastructure type	Definition	Ownership model	Revenue / utilization mechanism
Depot charging	Charging infrastructure located at fleet operating bases or depots and used primarily by a delivery or ridehailing vehicle fleet.	Typically owned by the fleet operator, leasing/financing company, or a third-party provider.	Costs may be paid directly by the fleet or bundled into vehicle leasing, financing, or mobility-service contracts. Charging serves a captive fleet with relatively predictable routes, schedules, and energy demand.
Destination charging	Chargers installed at locations where vehicles are already parked for another purpose, such as retail, hospitality, workplaces, or commercial facilities.	May be owned by the site host, a charging operator, or a third-party infrastructure provider under a host partnership.	Charging may generate direct revenue or be provided as an amenity. Site hosts can benefit from customer traffic and dwell time, while charging operators may use revenue-sharing or a leasing model.
Public charging	Publicly accessible shared charging infrastructure intended to serve the wider EV population.	Typically owned or operated by charging-network operators, energy companies, site hosts, or infrastructure investors.	Drivers pay for charging, typically based on energy delivered, time, or charging session. Utilization depends on EV adoption, charger location, accessibility, reliability, and charging demand.
Home charging	Private charging at a residence, typically using a dedicated AC charger or lower-power electrical connection and primarily serving one household or vehicle.	Typically purchased or owned by the vehicle owner, tenant, or residential property owner.	Electricity is purchased through the household electricity supply rather than through a separate charging service. Utilization is driven by the household's own vehicle charging needs.
Community charging	Shared charging infrastructure serving EV users within a neighborhood, residential development, or other local community.	May be owned by property owners or associations, charging operators, utilities, or third-party infrastructure providers.	Users typically pay for charging directly or through membership/subscription arrangements. Aggregating demand from multiple nearby users can improve utilization compared with individual home chargers.

EV and infrastructure market growth

Nigeria's EV fleet reached an estimated 20,000 vehicles by the end of 2025, representing approximately 400% growth since 2020, although EVs still account for less than 1% of the country's total vehicle fleet.[3] Commercial and high-utilization vehicle segments are emerging as important areas of early adoption, where higher daily mileage can strengthen the operating-cost case for electrification.

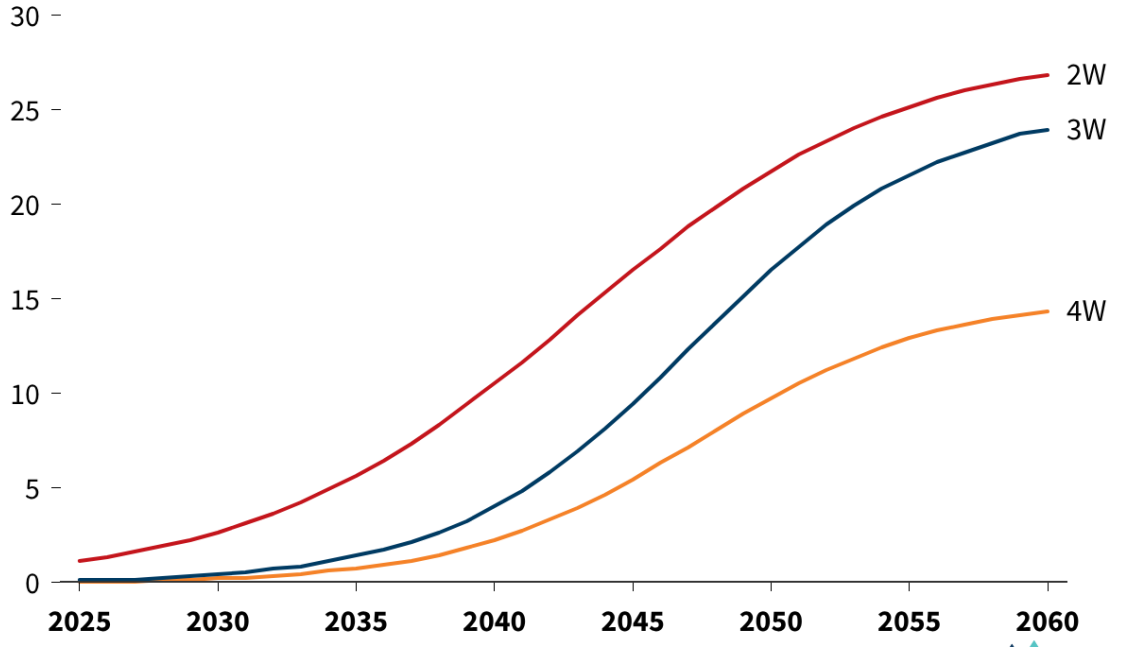
The market is expected to expand substantially over the coming decades, but the pace and composition of this growth will depend on the strength of policy support, infrastructure availability, and broader market development. To understand the range of potential EV and charging infrastructure needs, this report models two adoption scenarios:

- **Business-as-usual (BAU):** Assumes gradual policy support and charging infrastructure development, with EV adoption continuing broadly along its current trajectory (Exhibit 4).
- **Optimistic:** Assumes stronger policy support, affordable financing, faster charging infrastructure deployment, and greater market and consumer uptake, resulting in more rapid EV adoption across vehicle segments (Exhibit 5).

For each scenario, EV sales penetration is projected by vehicle segment and translated into annual EV sales and total EV stock. Charging and battery-swapping infrastructure requirements are then estimated based on the resulting fleet composition, daily vehicle utilization, energy consumption, charging behavior, and the charging model assumed for each segment. Public charging is modeled as individual charging points comprising a single charger with a connector.

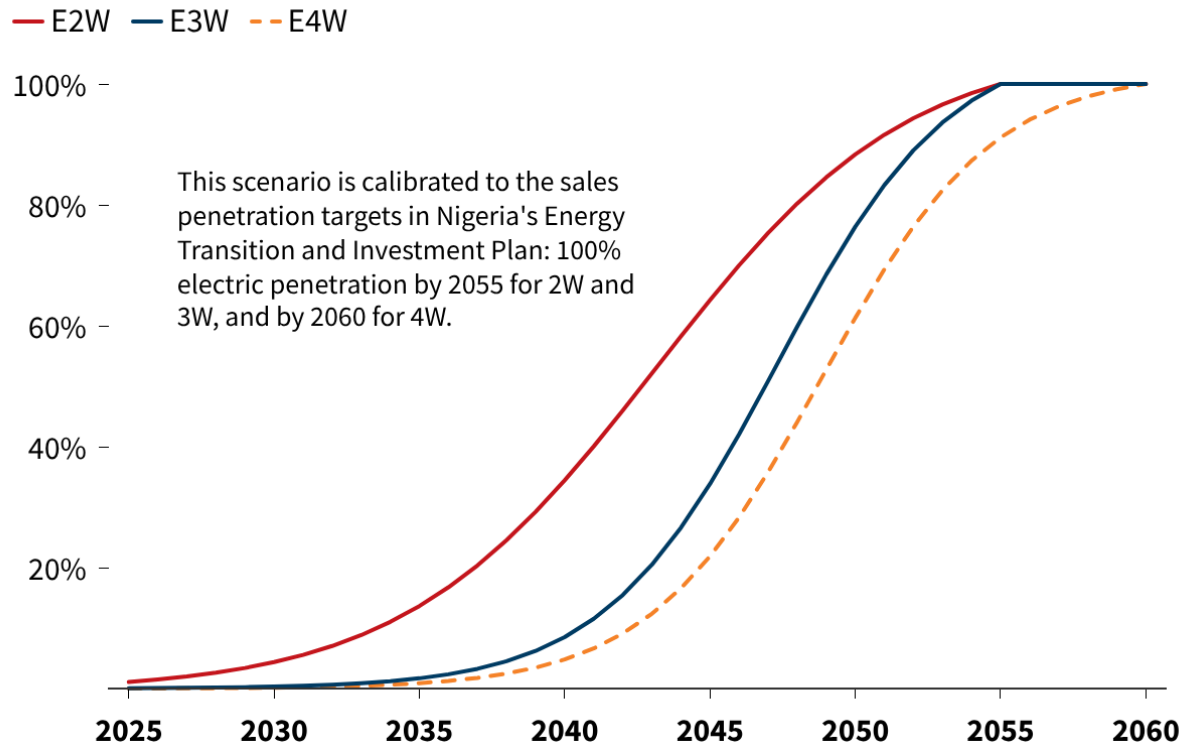
Based on vehicle utilization and energy-consumption assumptions, the analysis also estimates the corresponding daily and annual electricity demand from EV charging.

Exhibit 4: EV sales penetration rates in a business-as-usual scenario (%)



Source: RMI analysis

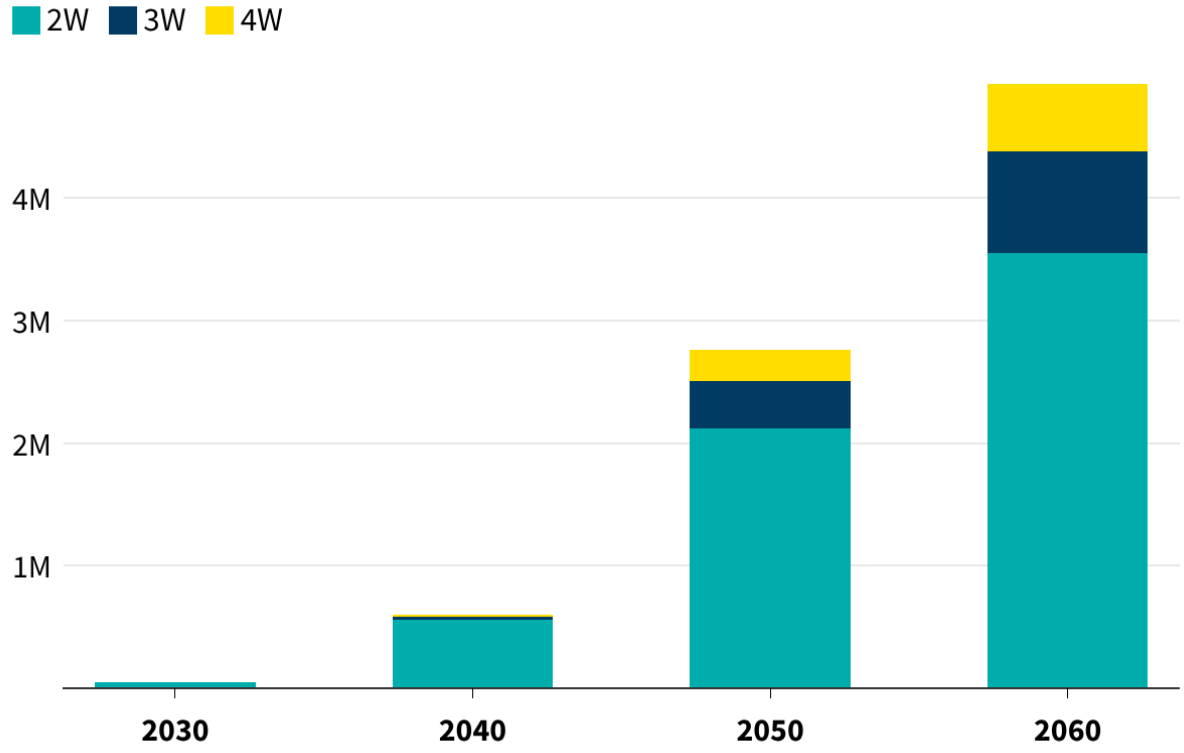
Exhibit 5: EV sales penetration rates in an optimistic scenario (%)



Note: Interim years follow a logistic adoption path anchored to terminal dates.

Source: RMI analysis and Sustainable Energy for All (SEforALL)

Exhibit 6: Projected number of EVs sold annually by segment, 2025-2060

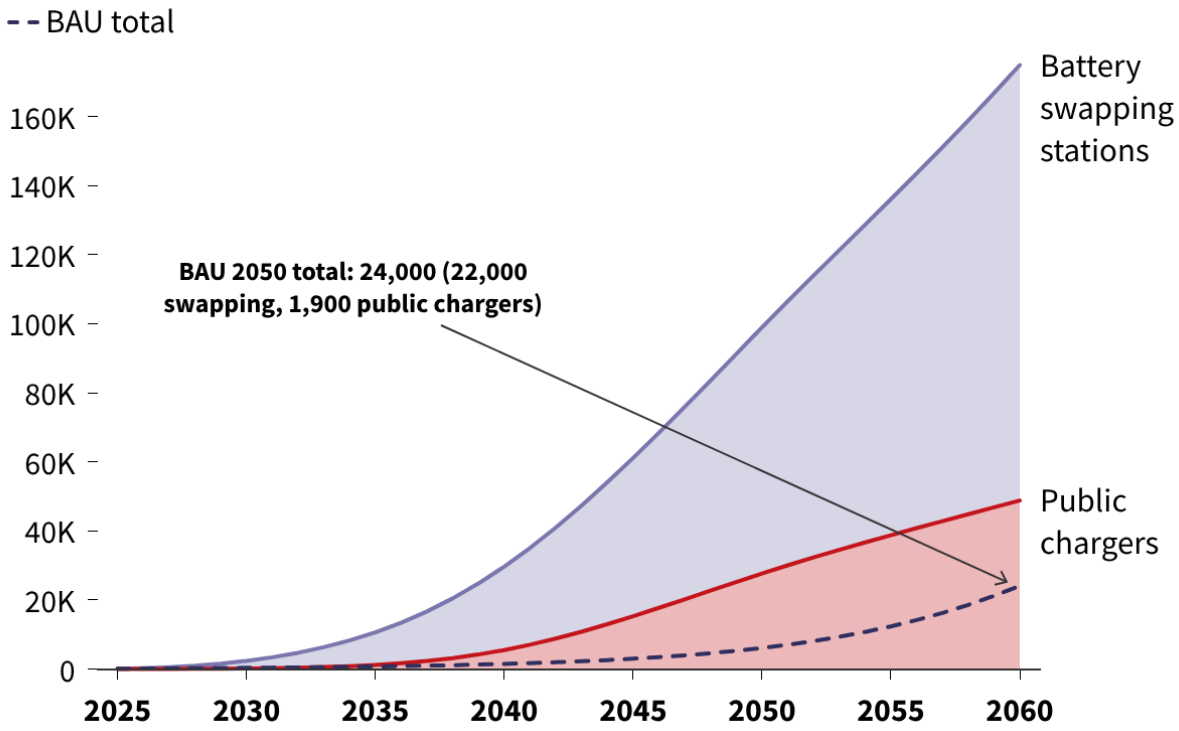


This scenario is calibrated to the sales penetration targets in Nigeria's Energy Transition and Investment Plan: 100% electric penetration by 2055 for 2W and 3W, and by 2060 for 4W.

Source: RMI analysis

Under a business-as-usual scenario, an estimated 1,500 chargers and battery-swapping stations are required by 2040, rising to 24,000 by 2060. Under the optimistic scenario, requirements increase from 15,000 chargers and stations in 2040 to 207,000 by 2060. Battery-swapping stations account for most of the modeled infrastructure requirement, reflecting the large share of E2Ws and E3Ws in the projected vehicle mix and the assumed charging model for these segments. These figures exclude home charging, which adds a further 79,000 to 1.6 million residential charging level 2 units by 2060 depending on the scenario. This will lead to an annual energy demand of roughly 1,200 gigawatt-hours (GWh) by 2040 and 43,100 GWh by 2060 in the optimistic scenario, as shown in Exhibit 8.

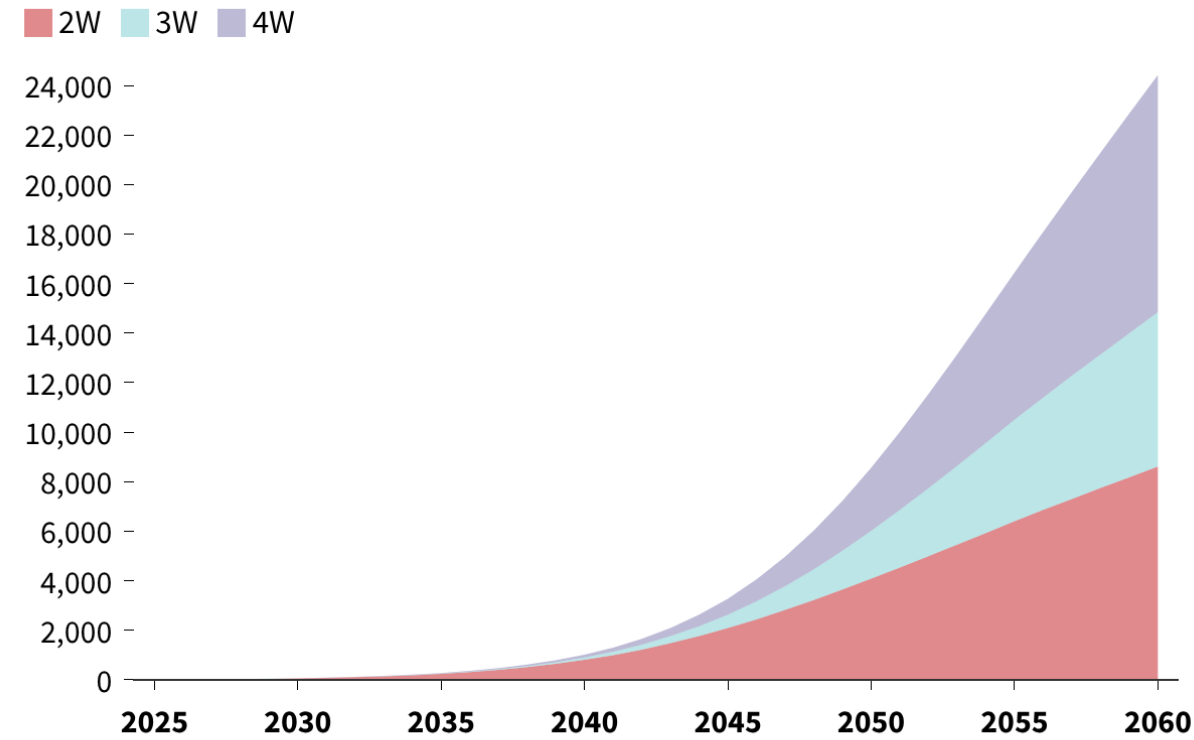
Exhibit 7: Cumulative charging infrastructure requirement in Nigeria, 2025-2060



Figures show projected infrastructure requirements, not a rollout plan. They are intended to convey magnitude only.

Source: RMI analysis and IEA

Exhibit 8: Annual energy demand in the optimistic adoption scenario, 2025-2060



Source: RMI analysis

Barriers to Effective Charging Infrastructure Deployment

Nigeria's charging market is gaining momentum through both policy development and early deployment. Charging infrastructure is increasingly part of the national electric mobility discussion, while early projects are beginning to test how different charging and swapping models perform under Nigerian operating conditions. However, moving from individual projects to a reliable, investable, and scalable charging ecosystem will require that several structural barriers be addressed.

Infrastructure planning and coordination

- Key challenge: Nigeria's policy momentum has not yet become a practical charging roadmap. Decisions on where to build, what reliability to provide, and how grid preparation will be sequenced remain dispersed across institutions. Planning responsibilities are also distributed across transport, power-sector, standards, and subnational institutions.
- Consequence: Developers lack a common reference for site selection and service design. Utilities and financiers assess projects case by case, which slows development and weakens

the investment signal. Distribution companies (DisCos), governments, and investors may plan independently, increasing the risk of infrastructure being deployed ahead of grid readiness or in locations that do not align with future demand.

Demand and utilization uncertainty

- Key challenge: The relatively small EV fleet and limited charging-use data make future charger utilization difficult to predict, particularly for public charging deployed ahead of demand.
- Consequence: Low or uncertain utilization weakens project economics and lengthens payback periods. Investment is therefore more likely to flow toward captive fleets, swapping networks, and other applications where demand can be aggregated or predicted.

Financing and investment constraints

- Key challenge: Charging assets require capital before demand data is available. Costs further increase where sites need additional power equipment to provide dependable service.
- Consequence: Projects without predictable utilization or anchor demand can struggle to demonstrate bankability. High capital and financing costs can increase charging prices and constrain deployment in locations where demand is still developing.

Standards and interoperability

- Key challenge: Common requirements are needed for charger safety, connectors, communications, payment systems, metering, data exchange, and equipment certification. Battery-swapping introduces additional interoperability considerations around batteries, interfaces, and safety.
- Consequence: Fragmented or proprietary systems can increase costs for consumers and operators, restrict interoperability, and create technology lock-in. Battery-swapping is especially exposed because early designs can shape the market before common specifications are set.

Grid capacity and reliability

- Key challenge: Charging infrastructure depends on both sufficient local network capacity and an electricity supply that is sufficiently reliable and affordable for the intended charging service. Requirements can become significant for DC fast charging, bus depots, and other high-power applications.
- Consequence: High-demand locations can still face high costs or delayed commissioning where the grid network is weak. Sites may face connection delays, network-upgrade costs, limited service availability, or high electricity costs. Grid constraints also raise the cost of site-level resilience, which affects tariffs and bankability.

Local technical capacity

- Key challenge: Domestic installation and maintenance capacity needs to grow with deployment. Operators need local capability to commission sites, diagnose faults, and restore service quickly.
- Consequence: Limited local capacity raises operating costs and lengthens repair times. It also slows the development of a Nigerian supply chain suited to local charging conditions.



Interventions to Scale Charging Infrastructure Development

Scaling charging and battery-swapping infrastructure in Nigeria will require more than increasing the number of charging sites. Infrastructure must be affordable for operators and users, reliable under local power-system conditions, accessible where charging demand emerges, and supported by development and grid-connection processes that allow projects to be deployed efficiently. At the same time, the market will need to mobilize sufficient capital to move from today's early projects to infrastructure deployment at scale.

Achieving this will require coordinated action across two areas:

- Policy and regulation: A comprehensive charging infrastructure policy and regulatory framework is needed to provide greater certainty for market participants and establish the conditions for a safe, interoperable, and competitive charging ecosystem. This includes clear requirements for charging and swapping infrastructure, standards and interoperability, electricity tariffs and resale, grid connections and permitting, framework for siting strategy, and coordination across relevant institutions.
- Finance and business models: A combination of concessional finance, risk-mitigation instruments, targeted public support, and commercially viable business models will be needed to mobilize private investment. Financing approaches should address high up-front costs and early utilization risk while supporting models that can progressively transition toward commercial financing as the market matures.

Together, these interventions can reduce the cost and risk of infrastructure deployment, improve charging reliability and accessibility, and create the conditions for private capital to scale alongside Nigeria's growing EV market. The following sections examine each of these strategies in detail.

Policy Solutions

National policies guiding EV charging infrastructure have only begun to emerge in Nigeria, with most EV policy to date focused on vehicle production and adoption:

- The Energy Transition Plan (ETP) identifies inadequate charging infrastructure as a barrier to transport electrification and proposes tax deductions or exemptions for companies investing in EV charging stations.
- The National Automotive Design and Development Council's (NADDC's) National Automotive Industry Development Plan similarly establishes targets for EV production and provides strategic direction for supporting infrastructure development.
- The Nigeria Agenda 2050 goes furthest on ambition, targeting EV charging outlets in 34% of Nigerian cities by 2030 and 100% by 2050, but offers limited implementation beyond references to appropriate incentives. [4]
- The Long-Term Low Emissions Development Strategy (2023) likewise calls for charging along major roads and in public places but sets no quantitative targets.[5]

The draft Electric Vehicle Transition and Green Mobility Bill represents a clearer shift toward infrastructure-specific policy. It identifies charging infrastructure as a national priority and assigns roles to the Standards Organisation of Nigeria (SON), the Federal Ministries responsible for transportation and power, and the Nigerian Electricity Regulatory Commission (NERC). Proposed provisions include requirements for fuel stations to install charging points and eligibility for private charging infrastructure to receive grants and tax credits.

In parallel, the SON has initiated work with the EV industry to develop an e-mobility standardization framework focused on safety, reliability, and interoperability and is commencing work on national guidelines for EV charging infrastructure. In 2026, NADDC and the Nigerian Electricity Management Services Agency (NEMSA) also strengthened cooperation on EV integration, with a focus on mitigating operational risks, preventing technical failures, and guiding the safe deployment of EV technologies, including charging infrastructure.[6]

Power-sector reforms are also changing how charging infrastructure may be approved and regulated. Under the Electricity Act 2023, states that establish their own electricity regulatory frameworks can regulate intrastate electricity generation, distribution, and trading, while NERC retains regulatory authority in states that have not transitioned.[7] As of May 2026, 15 states had moved to state-level electricity regulation. This means that aspects of the charging infrastructure regulatory landscape may increasingly vary across states, making national coordination and consistency important as the market scales.

The result is a market without a comprehensive charging infrastructure framework. Addressing this gap through a clear and coordinated policy framework can provide the certainty and enabling conditions needed for the market to scale. Below are the set of relevant policies that can support that growth in Nigeria.

Comprehensive roadmap and targets

What It Is

Just as countries need ambitious yet realistic EV adoption targets, they need national charging infrastructure roadmaps with clear targets to guide infrastructure build-out. A well-designed EV charging infrastructure roadmap builds on a baseline assessment, identifying the number, type, and location of charging stations required to support rapid EV adoption.

The roadmap should go beyond setting a national target for the number of chargers. It should **identify** what infrastructure is required, where it is needed, when it should be deployed, what the density and configuration should be, and what grid and enabling investments are required to support it. Targets can then be periodically updated as vehicle adoption, utilization patterns, technology, and market conditions evolve.

What It Solves

A charging infrastructure roadmap with targets sends a clear message to government ministries, agencies, and subnational bodies, along with private sector companies and investors, that there is a commitment to infrastructure build-out. This can motivate companies and increase the confidence of investors.

An EV charging infrastructure roadmap also serves as a key enabling tool alongside EV adoption targets. If a country plans for rapid commercial E2W adoption in urban areas, then battery-swapping station targets may be appropriate. Similarly, if a country foresees long-distance, high-speed EV use along highway corridors, fast-charging stations on highways can be prioritized.

Key Design Considerations

- **Targets based on market needs:** Charging infrastructure needs to be matched to vehicle segments, operating patterns, geographic use patterns, and local demand rather than deployed uniformly. A coordinated approach to infrastructure selection and siting can identify where different charging and swapping solutions are most appropriate, while enabling DisCos and other stakeholders to anticipate future electricity demand and plan the network upgrades and distributed energy solutions required to support it.
- **Specifications by type and geography:** The roadmap should translate national targets into more granular infrastructure requirements for urban areas, intercity corridors, and other priority locations. In cities, this can include targets for the number, type, and geographic coverage of public chargers, community charging, battery-swapping stations, and fleet/depot infrastructure based on expected demand and travel patterns. Along highways and intercity corridors, the roadmap can establish indicative maximum distances between charging locations, appropriate charger power and capacity, and priority locations based on traffic flows, vehicle range, dwell times, and route characteristics.
- **Charging station type by pattern:** Battery-swapping, E2W charging, anticipated home charging, E4W public charging, and heavy-duty EV charging all correspond to unique vehicle types with different anticipated fleet growth patterns. The roadmap should reflect these patterns.

- **Cost and financing considerations:** The cost of charging infrastructure, and the available business models for financing and ownership also dictate realistic plans in an EV charging roadmap. For example, fast-charging infrastructure may be appealing on Nigerian inter-urban highways, but the cost can be a magnitude greater than a regular E4W charger.
- **Leading government body:** National charging delivery could be coordinated by the Presidential Initiative on Compressed Natural Gas and Electric Vehicles (Pi-CNG & EV) through a published roadmap that converts clean-mobility targets into an accountable delivery sequence. The roadmap should define how projects move from demand identification to commissioning, with clear institutional ownership and timelines.

Global case study in practice

To match the EV adoption targets set for 2030, Indonesia's Ministry of Energy and Mineral Resources (MEMR) established its 2025–2030 Public EV Charging Station Development Plan, which set a goal of around 50,000 public E4W charging stations (Stasiun Pengisian Kendaraan Listrik Umum, or SPKLU) and 200,000 battery-swapping stations by 2030. To reach these numbers, MEMR has applied an approximate target ratio of 15 vehicles to each station.[8] While ambitious, the targets are appropriate for the country's goal of deploying 2 million electric cars and around 12 to 13 million E2Ws.

MEMR has also considered the type of charger needed for different vehicle types and use patters. Stasiun Penyedia Listrik Umum (SPLU) chargers, which are lower power public charging stations fit for E2Ws, are distinct from SPKLU, fast-charging, and battery-swapping. The national utility, Perusahaan Listrik Negara (PLN), is playing a central role in the planning and rollout of charging infrastructure, and is increasingly collaborating with private sector partners to finance and construct infrastructure.

Up-front subsidies

What It Is

A targeted fiscal package that lowers the up-front cost of certified charging infrastructure through capital-cost subsidies, tax exemptions, and income-tax measures. By reducing the cost burden on the initial investment, these incentives operate similarly to a capital subsidy and improve project viability during early market development. Fiscal measures can include the following:

Incentive	*How it works*
Capital subsidy	Covers a defined share or amount of eligible charging infrastructure capital costs and installation, directly reducing the up-front investment required from the developer.
Import duty or VAT exemption	Reduces or removes customs duties or VAT on eligible imported equipment and components, including charging units, batteries, meters,

	power electronics, and grid-interface equipment, lowering landed equipment and installation costs.
Investment tax credits	Allows investors to deduct a share of eligible capital expenditure directly from their tax liability. Credits may be refundable, transferable, or carried forward.
Accelerated depreciation	Allows charging assets to be depreciated more rapidly for tax purposes, bringing deductions forward and improving early cash flow.

What It Solves

Charging infrastructure requires significant up-front investment, and in Nigeria these costs are amplified by dependence on imports and foreign exchange exposure. Targeted tax incentives can reduce equipment and installation costs, improving project viability during the early market stage before utilization is sufficient to support full commercial cost recovery.

Key Design Considerations

- **Eligibility and technical standards:** Define eligible charging and associated electrical infrastructure clearly, and limit support to equipment that meets applicable safety, performance, and interoperability requirements. Eligibility can extend beyond the charger itself to necessary electrical infrastructure, such as transformers, switchgear, metering, and grid-connection equipment where appropriate.
- **Targeting by use case:** Prioritize support based on the market barrier being addressed. Public charging may warrant greater support where infrastructure provides broader network benefits but is unlikely to be commercially viable at early levels of EV adoption. Support can also target high-utilization depots, battery-swapping, and productive-use charging where reducing up-front costs can accelerate deployment and wider EV adoption.
- **Point of support:** Apply incentives where they reduce project capital expenditures most directly, such as import duty relief, VAT exemption, accelerated depreciation, or investment tax credits for qualifying charging assets.
- **Local supply-chain development:** Use higher or longer relief for certified local assembly, after-sales service, warranty support, and technician training. This helps shift the market from imported equipment toward domestic production. Local-content requirements should be phased in carefully so they support domestic capability without unnecessarily increasing infrastructure costs or slowing deployment during the early market.
- **Fiscal control and compliance:** Use sunset clauses, volume and funding caps, and periodic reviews so that fiscal support remains a market-building instrument rather than a permanent expenditure or revenue loss. Link eligibility to equipment registration, safety inspection, appropriate data reporting, and traceable import or assembly records.

Global case study in practice

Rwanda provides a useful example of tax incentives that support charging infrastructure as part of a wider e-mobility market. Its policy framework extends fiscal policies beyond vehicles to batteries and charging equipment, lowering the up-front cost of assets needed to build the charging ecosystem.[9]

India's PM E-DRIVE scheme provides another strong example of direct capital support. The scheme allocated ₹2,000 crore specifically for public EV charging infrastructure, including public charging stations, battery-swapping stations, and battery-charging stations. Subsidies can cover upstream electrical infrastructure and charging equipment, with the level of support varying by location category and reaching up to 100% in some categories.[10]

Tariff design

What It Is

A dedicated, preferential electricity tariff for EV charging infrastructure, applied through dedicated meters to public charging stations, fleet and depot charging, and battery-swapping stations. The tariff can combine preferential energy rates, time-of-use pricing, reduced fixed or demand charges during early market development, and smart-metering requirements. As the charging market matures and utilization increases, preferential treatment can be progressively adjusted to support appropriate network-cost recovery.

What It Solves

Electricity tariffs are a key determinant of charging costs. Applying conventional commercial or industrial tariffs to charging infrastructure can result in high electricity costs, particularly during the early market when charger utilization is low, and fixed or demand charges are spread across relatively few charging sessions. A preferential EV tariff can lower early charging costs while providing operators with predictable electricity pricing. When combined with time-of-use rates, it can also encourage flexible charging during periods when electricity is cheaper or the network is less constrained, improving both charging economics and grid utilization.

Key Design Considerations

- **Dedicated EV customer class:** Establish a separate tariff category for EV charging for public chargers, depots, battery-swapping stations, and larger premises-based sites.
- **Time-of-use rates based on Nigerian system data:** Set preferential charging windows using load, generation, and demand patterns. Lower rates should encourage flexible charging during periods when electricity can be supplied at a lower cost, while higher rates can discourage unmanaged charging during constrained periods. In Nigeria, a lower off-peak (22:00–06:00) rate targeted at overnight depot charging, a standard rate from 06:00 to 17:00, and a peak surcharge from 17:00 to 22:00 would align with when battery-swapping operators actually recharge.
- **Reduced or phased demand charges:** Reduced or phased demand charges can avoid making fixed network charges a large share of the landed tariff before charging demand has matured. They can also limit the early cost burden on operators while preserving a route for DisCos to recover network costs as utilization rises.
- **Smart metering from the outset:** Require time-of-day recording and remote reading for all dedicated EV charging connections. This enables accurate billing, tariff review, load-shape analysis, and future managed-charging programs.
- **Predictable review and phase-down:** Establish a defined review process for preferential energy rates, time-of-use periods, and fixed- and demand-charge treatment. Preferential

treatment should be reviewed as EV adoption and charger utilization increase to ensure that charging infrastructure progressively contributes an appropriate share of network costs.

Global case study in practice

The Electric Vehicles Policy 2023 of Tamil Nadu, one of India's leading EV markets, proposed reducing demand charges for public charging stations by 75% for the first two years and 50% for the subsequent two years. The policy also proposed a 50% reduction in energy charges between 8 a.m. and 4 p.m. to encourage charging during non-peak hours and promote renewable energy use.[11]

Tamil Nadu's public EV charging tariff also uses differentiated time-of-use pricing, with lower rates of ₹8.00/kWh during midday and overnight periods, a shoulder rate of ₹10.00/kWh, and an evening peak rate of ₹12.00/kWh. Demand charges are differentiated by connection size. The combination of daytime and overnight low-rate periods accommodates different charging profiles, allowing depot operators to shift charging overnight while solar-supported charging and swapping facilities can take advantage of lower daytime rates. The evening peak rate, 50% above the lowest rate, provides a clear price signal to shift flexible charging away from periods of greater system demand.

Kenya offers a practical regional case study for designing dedicated electricity tariffs to support EV charging infrastructure. In March 2023, the Energy and Petroleum Regulatory Authority approved a new Schedule of Tariffs, effective 1 April 2023, that introduced a dedicated Electric Mobility category. Method EM applies to e-mobility consumers metered at 240 or 415 volts whose consumption does not exceed 15,000 units per billing period, at an energy charge of KSh 16 per unit and KSh 8 per unit for supply metered off-peak. Both rates sit below the prevailing domestic and small commercial tariffs, which were set at KSh 20.97 and KSh 20.18 per kWh respectively for consumption above 100 kWh. Levies and pass-through charges raise the delivered cost materially above these base rates, to roughly KSh 32 per kWh at peak and KSh 22 off-peak, so the tariff lowers rather than removes the operating cost burden on charge point operators.

Kenya's experience also shows that a tariff class requires an enrollment mechanism to take effect. Three years after introduction, only a few hundred customers had been metered under the category against a national fleet of more than 35,000 electric vehicles, and Kenya Power has since begun a migration exercise to bring existing charging load onto the correct tariff.[12]

Land concessions

What It Is

Land availability and cost are critical considerations for charging infrastructure, due to the need for sites to be located in high-demand and easily accessible areas. Suitable land can be difficult or expensive to secure, increasing up-front and recurring site costs and ultimately affecting

charging economics. Governments can reduce this barrier by providing land on concessional terms through long-term leases, utilization- or revenue-sharing arrangements, and land-related tax incentives, or competitively tendering government-owned and public land at preferential rates. Public landowners can also use site-host agreements to provide operators with secure access to strategically located sites.

Land concessions are particularly relevant where location is critical to utilization and the charging operator does not already control the premises, including public charging hubs, corridor charging, community or shared charging, and battery-swapping hubs. Concessions should provide sufficient tenure for operators to recover their infrastructure investment while avoiding high fixed land costs before charging demand has matured. The instrument has the greatest effect where a usable grid connection, or a grid-plus-solar configuration, can reduce reliance on expensive backup supply.

What It Solves

Site access costs are incurred before utilization is proven. For public charging, corridor charging, and shared swapping hubs, high rent or uncertain tenure can raise the landed tariff before the asset has built demand. A concession structure reduces that pressure by linking the land payment to actual charging activity. Permitting creates a second source of development risk: time and uncertainty. Where developers cannot predict approval requirements or timelines, delays increase project costs and can deter investment altogether. A standardized and transparent permitting process can reduce this uncertainty and accelerate project development.

Key Design Considerations

- **Site selection:** Land allocation should be coordinated with power availability and connection feasibility. Strategically located land may have limited value for charging if the site requires prohibitively expensive grid upgrades or cannot obtain sufficient power. Combining land concessions with standardized permitting and greater visibility into grid-connection requirements can lower development costs, shorten project timelines, and improve bankability without requiring government to own or operate the charging infrastructure.
- **Land-payment mechanism:** Select the land-payment mechanism based on expected utilization and project maturity. Fixed or discounted leases provide predictable costs and may suit sites with established demand, while per-kWh, per-swap, or revenue-sharing arrangements can reduce fixed costs for early-stage sites where utilization remains uncertain. Hybrid structures, such as a low base lease combined with a utilization-linked payment, can balance operator risk with the public landowner's need to recover value as demand grows.
- **Asset-recovery period:** The concession term needs to be long enough for operators to recover charging and power-infrastructure investment. Short leases raise financing risk and can force higher user tariffs.
- **Standardized permitting route:** Developers need one documented pathway from site approval to site commissioning, with clear agency responsibilities and timelines. This becomes particularly more important as the devolved state electricity markets develop.
- **Performance-linked access:** Concessional land should come with requirements for uptime, safety, pricing disclosure, and data reporting. The public value comes from reliable charging service, not land allocation alone.

Global case study in practice

Singapore provides a useful example of using public land and competitive tendering to support EV charging deployment. The government established a tendering process for the installation and operation of EV charging points in public car parks across the country, led by the Urban Redevelopment Authority (URA) and Land Transport Authority (LTA). The initiative supported Singapore's national target of deploying 40,000 charging points in public car parks by 2030.[13]

The tender used a structured evaluation framework that considered both price and quality, with bidders assessed based on charging rates, a financially sustainable business model, and the range of services offered. These services covered the installation, operation, and maintenance of charging infrastructure, as well as assessment of any grid upgrades required to support deployment. The pilot tender was awarded to two consortiums led by ComfortDelGro Engineering and Primech A&P, covering public car parks at locations including public housing estates, industrial estates, public parks, and community centers.

Nigeria has the instruments to run a comparable allocation. In Lagos, the Public-Private Partnership Law (revised 2023) empowers the Office of Public-Private Partnerships (PPPs) to grant concessions and leases over public assets and to tender government land competitively,[14] and the Infrastructure Concession Regulatory Commission Act provides the federal equivalent. Suitable corridor land may be available through the Lagos Metropolitan Area Transport Authority, which controls the bus rapid transit corridors, and through the Federal Roads Maintenance Agency and Federal Ministry of Works for right-of-way along federal highways. Because all such land is vested in the state, any allocations require the governor's consent under the Land Use Act, a step that should be built into the permitting timeline. Other states can replicate the Lagos model by enacting their own PPP legislation and directing their transport and physical-planning agencies to tender public land for charging on the same terms.

Charging infrastructure standards

What It Is

Charging infrastructure standards establish common technical requirements for how charging equipment is designed, installed, connected, operated, and maintained to ensure safe, reliable, accessible, and interoperable service. Standards can cover charging equipment and connectors, electrical and installation requirements, communication protocols, metering, payment systems, equipment testing and certification, and safety requirements.

Standards are particularly important for public charging and battery-swapping, where infrastructure serves multiple users and incompatible systems can create interoperability and technology lock-in risks. For private and captive depot charging, the immediate priority is ensuring electrical safety, equipment quality, and appropriate installation, while broader interoperability requirements can evolve as the market develops.

What It Solves

Standards give the market a common basis for safe deployment and future interoperability. Without them, early networks can develop limitations due to a dependence on proprietary equipment and closed operating systems. This can benefit individual pilots while raising the cost of later correction and reducing the bankability of shared infrastructure. Battery-swapping needs the earliest attention because the battery-station interface determines both service quality and asset value. In many models, the battery is the core financed asset. Clear requirements for the interface, operating safety, and traceability help operators manage battery assets and give lenders confidence that assets can be tracked and reused.

Key Design Considerations

- **Build on SON's current process:** The Standards Organisation of Nigeria (SON) is the key federal statutory body responsible for developing, harmonizing, and enforcing quality standards, measurements, and industrial product compliance across Nigeria. SON could lead the standards pathway, using the charging infrastructure guidelines in progress as the policy anchor. The guidelines can define the approval framework, while SON sets the technical requirements that determine whether equipment and sites are fit for operation.
- **Prioritize safety while progressively enabling interoperability:** Initial requirements should establish the minimum safety, equipment quality, installation, and communication requirements necessary for charging assets to operate safely. Interoperability requirements can then expand as the market develops, prioritizing interfaces where proprietary systems would create significant consumer or infrastructure lock-in.
- **Treat battery-swapping as a distinct standards track:** Battery-swapping requires specific requirements for battery and station interfaces, electrical and mechanical safety, battery identification and traceability. Interoperability should be pursued where it provides clear market benefits without prematurely mandating a single battery design.
- **Adopt international standards selectively:** Nigeria can draw from IEC and ISO standards where they fit local operating conditions. The immediate task is to define the minimum Nigerian standard set needed for safe deployment and investor confidence.
- **Link compliance to market access:** Access to public support and regulatory approvals should depend on approved standards. This makes compliance part of the market framework without turning every pilot into a lengthy approval process.

Global case study in practice

The widespread commercial deployment of the Combined Charging System (CCS) standard in 2013 and eventual commercial deployment of the CCS2 standard in 2014 illustrate how global EV standards have developed, and the value they can provide. CCS was initially conceived as a way to combine DC and AC charging into a single plug, and fast charging was soon incorporated in the CCS2 plug design. The CCS2 standard was the result of the coming together of seven OEMs (including Audi, BMW, Daimler, Ford, General Motors, Porsche, and Volkswagen), the European Automobile Manufacturers Association, and the Charging Interface Initiative.[15] The standard was submitted to international standardization bodies for adoption, and has since been widely adopted as the default charging standard in Europe, India, South America, and other major markets in Africa and Asia.[16] Collaboration on the plug design between otherwise competing

companies, and coordination across different markets has unlocked a larger market for all companies, allowing vehicle owners to cross borders and easily find compatible charging infrastructure.

Practical implementation of the proposed policy solutions

Standards should be developed first, especially for battery swapping, where technical lock-in can happen quickly. Tax incentives are the fastest of the four measures to implement once SON and NEMSA have a credible list of approved equipment, but they only work if relief is tied to certification and deployment data. Without that discipline, the incentive may not lower project cost. Land concessions and permitting sit on the lower end of the regulatory-risk scale because they depend mainly on state land and PPP institutions. They may still need a template concession structure and at least one demonstration transaction before utilization-linked rent becomes familiar practice.

Tariff design is the most complex and time-sensitive intervention because it spans NERC and state regulators in a devolving market. Divergent approaches will be difficult to unwind once they are in place. Across the proposed solutions, the binding issue is coordination among SON, NEMSA, NERC, state regulatory commissions, and Pi-CNG&EV, with Pi-CNG&EV serving as convener and reporting body.



Financing Solutions

While policy is a critical catalyst for charging infrastructure deployment, scaling the market will also require substantial investment in charging equipment, grid connections, power infrastructure, batteries, and associated site development. Mobilizing sufficient and affordable capital will therefore be critical to translating enabling policies and market demand into infrastructure deployment at scale.

In Nigeria's early charging market, however, projects face a combination of high up-front capital requirements, uncertain utilization, limited operating track records, and relatively small project sizes, making conventional commercial finance difficult to access. Financing solutions will therefore need to address not only the availability and cost of capital, but also the underlying risks that prevent charging projects from generating predictable and bankable cash flows.

Utilization is particularly important to charging economics. Charging infrastructure requires capital to be deployed before demand is fully established, creating a period in which revenues may be insufficient to meet commercial return or debt-service requirements. The current sensitivity analysis indicates that charging throughput has roughly twice the effect on project economics as financing costs. The financing challenge is therefore not simply the availability of cheaper debt, but how to support projects through the utilization ramp and create sufficiently predictable revenues to attract commercial capital.

The financing requirement also extends beyond the charger itself. Depending on the business model and site, investment may include batteries, grid connections and electrical upgrades, solar and storage, digital infrastructure, land and site development, and working capital. Where operators must invest in their own reliable power supply, the project increasingly resembles a combined charging and distributed energy infrastructure investment rather than a stand-alone charging asset.

Financing to date has followed the underlying business model rather than the charging asset itself. Battery-swapping platforms have raised capital against integrated businesses spanning vehicles, batteries, swapping infrastructure, and related operations; fleet charging has been supported through broader vehicle and fleet-financing structures; and destination and public charging have largely relied on sponsor, host, or corporate balance sheets. Ring-fenced financing supported primarily by charging revenues has yet to emerge at scale. The table below illustrates some of the financing approaches in the country.

Exhibit 9: Examples of financing structures observed in Nigeria's charging market

Business Model	Financing Approach Observed	Illustrative Structure
Battery Swapping	Corporate/platform-level equity and debt financing covering an integrated business that includes vehicles, batteries, swapping infrastructure, and technology.	**Spiro:** Corporate equity and debt have financed expansion across multiple African markets, including expansion of its battery-swapping network. Individual swap stations are not financed as stand-alone projects.
Fleet/Depot Charging	Charging can be embedded within a broader fleet proposition, while	**LagRide:** UBA's $100 million Drive-to-Own facility finances vehicle acquisition

	financing is primarily secured against vehicles and fleet operations rather than charging revenues.	for the LagRide ecosystem. The publicly disclosed facility does not separately identify charging infrastructure as a financed asset.
Destination Charging	Early deployment appears to rely on partnerships between charging/vehicle providers and site hosts, but financing structures are not generally publicly disclosed.	**SAGLEV at Mega Plaza:** SAGLEV partnered with Mega Plaza to deploy charging infrastructure at an existing commercial site; the financing structure for the chargers has not been publicly disclosed.
Public Charging	Financing structures remain difficult to observe publicly, with limited evidence of stand-alone debt secured primarily against charging revenues.	**LUG West Africa**: LUG plans to integrate more than 250 charging points with its existing solar street-lighting platform.

As the market scales, financing structures will need to evolve beyond reliance on corporate balance sheets and integrated business models. Different instruments will be appropriate for different risks and stages of market development:

- Demand aggregation and contracted-revenue mechanisms can improve cash-flow predictability and distribute risks across multiple stakeholder parties
- Catalytic capital and viability-gap funding can close early commercial gaps
- Credit guarantees and risk-sharing facilities can reduce lender exposure
- Portfolio pooling can aggregate smaller projects into investable portfolios
- Project finance and public-private partnerships can mobilize longer-term capital for larger and more mature infrastructure opportunities.

Together, these mechanisms can help charging projects move progressively from early-stage public and catalytic support toward greater reliance on commercial capital as utilization, operating track records, and market confidence improve.

Demand- or revenue-based contracts and charging-as-a-service

What It Is

Demand- or revenue-based contracts improve the predictability of charging revenues by securing a minimum level of utilization or payment before infrastructure investment is committed. An anchor user, such as a fleet operator, logistics company, transit agency, or other high-utilization customer, commits to use or pay for a defined level of charging service in exchange for dedicated or priority access to charging capacity.

The structure can take different forms. Demand-based contracts, such as minimum-throughput or take-or-pay agreements, commit customers to a defined level of charging use or payment. Revenue-based contracts, such as capacity-reservation or availability-based agreements, provide

a defined payment for making charging capacity available and meeting agreed service levels. The arrangement does not transfer delivery or operating risk away from the charging operator. The operator remains responsible for asset performance and service availability, while part of the forecast demand is converted into contracted receivables.

Charging-as-a-Service (CaaS) applies the similar principle through a third-party ownership model. A charging provider finances, owns, installs, and typically operates the infrastructure, while a fleet pays for charging through a long-term service agreement rather than investing in the assets up front. Payments can be structured around energy consumed, charging capacity, vehicle usage, or fixed service fees.

What It Solves

Low and uncertain utilization undermines early-stage charging economics because infrastructure must often be deployed before sufficient vehicle demand has developed, while capital recovery and fixed operating costs begin once the asset is commissioned. Demand- or revenue-based contracts establish a minimum revenue base during the utilization ramp, reducing cash-flow uncertainty and improving the ability of developers to secure debt financing or other long-term capital. CaaS addresses an additional constraint: the up-front capital requirement for fleets and site hosts. By shifting infrastructure ownership and financing to a third-party provider, customers can access charging infrastructure without funding the full up-front investment themselves.

Key Design Considerations

- **Use-case identification:** These arrangements are best suited to fleet and shared commercial charging**,** where repeat demand can be linked to identifiable customers and predictable vehicle operations. They can also support shared or public charging infrastructure where one or more fleets provide an anchor demand base while remaining capacity serves other users. They are less applicable to purely public charging locations where demand is diffuse and no credible anchor customer can commit to minimum utilization.
- **Creditworthy counterparties:** Revenue support is bankable only where counterparty creditworthiness is sufficient; weaker counterparties require additional payment security or credit enhancement such as guarantees.
- **Appropriate payment basis:** The payment structure should allocate utilization risk to the party best able to manage it, using throughput-based commitments where demand is controllable, and capacity or availability payments where only access can be assured.
- **Balanced risk allocation:** The contract should allocate utilization risk to the party controlling vehicle deployment and service-performance risk to the operator, with clear adjustment and termination provisions for material changes in project conditions.
- **Performance conditions:** Payments should be linked to clearly defined service levels, including charger availability and other relevant performance requirements, with pre-agreed deductions or remedies for material underperformance.

Global case study in practice

Bogotá's electric-bus program demonstrates how long-term contracted revenues can improve the bankability of electric mobility assets. The city separated asset provision from fleet operations, allowing private providers to finance and supply electric buses and charging infrastructure while separate operators manage fleet operations and maintenance.[17] TransMilenio, Bogotá's public authority responsible for managing the city's integrated public

transport system, contracts directly with these providers, with payments supported by the city's fiscal commitment.

Payments are linked to vehicle availability and service delivery, providing asset providers with greater revenue certainty than a model dependent primarily on passenger demand or charging utilization. By providing predictable contracted revenues through a creditworthy public counterparty, the model reduces demand and revenue risk and improves the ability of private providers to finance the required assets.[18]

Catalytic capital and viability gap funding

What It Is

Catalytic capital and viability-gap funding (VGF) provide concessional capital to satisfy the project's financing requirement that cannot initially be supported on commercial terms. Catalytic capital can take the form of concessional debt, equity, or other structures that mobilize additional commercial investment.

VGF typically provides a grant or capital contribution to close a defined viability gap where a strategically important project has credible long-term economics but cannot recover its full capital cost under prevailing market conditions. The structure should mobilize as much commercial capital as the project can support while retaining meaningful sponsor and lender exposure to delivery and operating performance. Its role is to bridge early bankability constraints without weakening underwriting discipline.

Catalytic capital is best suited to first-of-kind portfolios, expansion into new markets, and shared infrastructure with credible demand but insufficient early cash flow to support the full capital requirement, making it ideal for public charging infrastructure projects. It can also fund demonstration projects that establish operating data and validate a model for subsequent commercial financing.

What It Solves

Early charging projects may cover operating costs but remain unable to support commercial return requirements, debt service, or suitable financing tenors during the utilization ramp. This gap is most acute where infrastructure is deployed ahead of demand and revenues build gradually after commissioning. Catalytic capital improves the project's financing profile by lowering the blended capital threshold and increasing debt capacity. It enables projects with credible long-term economics to proceed without permanent subsidies or requiring the public sector to assume the full financial risk.

Key Design Considerations

- **Quantified financing gap:** Support should be calibrated to the difference between total project cost and the capital supportable by expected project cash flows. Catalytic capital should absorb a specific layer of early-stage risk while preserving meaningful sponsor

and lender exposure. It is unsuitable where the funding gap reflects weak site economics, inadequate demand, or no credible path to commercial viability.

- **Time-bound support:** The concessional contribution should decline as utilization, revenue performance, and debt-service capacity strengthen. Funding should be released against verified delivery and operating thresholds rather than provided fully up front. The structure should include clear repayment, buyout, or refinancing triggers once the project reaches agreed performance levels.

Global case study in practice

The African Development Bank's Green Mobility Financing Facility for Africa (GMFA) provides an example of using concessional capital to help build an investable e-mobility market. The facility is intended to support electric buses, two- and three-wheelers, charging and battery-swapping infrastructure, renewable energy integration, and EV manufacturing. It combines financing instruments, including concessional and senior debt, with technical assistance to help projects progress toward commercial investment. In June 2026, the Global Environment Facility approved $13.46 million for the facility, comprising a $12.46 million concessional loan and a $1 million technical-assistance grant. The funding is intended to help establish the financing platform and catalyze additional investment in green mobility projects, including renewable-energy-powered charging infrastructure.[19]

Credit guarantees and risk-sharing facilities

What It Is

Credit guarantees and risk-sharing facilities absorb an agreed share of lender losses if a charging project or portfolio defaults. Risk can be allocated through structures such as **first-loss or second-loss coverage, partial credit guarantees, or proportional risk sharing**, depending on which layer of risk the facility is designed to absorb. Coverage can apply to bank loans, bonds, receivables facilities, or portfolios of eligible assets. Portfolio structures can spread risk across multiple borrowers or charging sites while allowing lenders to finance projects under a common risk-sharing framework.

These instruments do not replace the underlying financing or transfer all project risk to the guarantor. Sponsors remain responsible for project performance, while lenders retain some financial risk, giving them an incentive to carefully assess and monitor the project. By reducing expected lender losses, guarantees can improve the risk profile of charging investments and support longer tenors, larger loans, reduced collateral requirements, or lower financing costs.

What It Solves

Nigerian lenders may restrict tenor and loan size because charging projects have limited operating records, uncertain early revenues, and equipment with low resale value. This can lead to short repayment periods, high collateral requirements, and limited lending even where the

project is viable. A guarantee covers part of the lender's loss if the borrower defaults. This can support longer tenors, larger loans, and lower collateral requirements. At a portfolio level, it also allows lenders to assess a group of similar assets rather than underwrite each charging site separately. This eventually builds confidence in public and private charging projects, and supports the growth of infrastructure until the market becomes more mature and self-sustaining.

Key Design Considerations

- **Loss allocation:** The structure should define whether losses are covered on a first-loss, proportional, or transaction basis and distinguish default from normal commercial underperformance.
- **Guarantee pricing:** Fees should reflect the risk covered without removing the financing benefit created through lower interest rates, longer tenors, or reduced collateral requirements.
- **Portfolio eligibility:** Eligible assets should meet minimum standards for revenue visibility, operating performance, technical compliance, and reporting. Concentration limits should prevent excessive exposure to one operator, location, or business model.
- **Claims and recovery:** Default events, cure periods, claims procedures, lender obligations, and recovery allocation should be agreed o**n** before financial close.

Global case study in practice

InfraCredit provides local currency guarantees for eligible Nigerian infrastructure debt, covering scheduled principal and interest and enabling qualifying instruments to achieve stronger domestic credit ratings and longer tenors. This allows insurers and other institutional investors to provide long-term naira financing. While the model is not specific to EV charging, it provides a relevant precedent for the sector. Credit enhancement could help charging projects with credible cash flows overcome lender concerns around limited operating history, collateral value, and sector familiarity. As the market develops, the approach could also support larger or pooled charging portfolios seeking long-term local-currency financing.[20]

Project financing and pooling

What It Is

Portfolio pooling combines multiple charging sites or assets into a larger financing structure, creating sufficient scale and diversification for lenders and investors to assess the portfolio collectively rather than financing each site individually. The assets can be held within a dedicated project vehicle, with financing raised primarily against the portfolio's expected cash flows and project assets rather than the broader balance sheet of the sponsor. Under a project-finance structure, revenues can be kept separate within the project entity, while project risks can be allocated contractually among the sponsor, lenders, customers, operators, and other counterparties.

What It Solves

Individual charging sites may be too small to justify the transaction and due-diligence costs associated with project finance and can be highly exposed to site-specific utilization risk. Reliance on corporate financing also ties infrastructure expansion to the balance-sheet capacity of individual charging operators. Pooling creates sufficient scale for structured finance, diversifies site-level performance risk, and allows lenders to underwrite aggregate cash flows. Once the portfolio establishes an operating record, refinancing can lower financing costs and release sponsor capital for further deployment.

Key Design Considerations

- **Comparable assets:** Sites should have sufficiently similar revenue models, customer profiles, utilization patterns, and technical configurations to support common underwriting and portfolio-level assumptions.
- **Standardized arrangements:** Customer contracts, tariffs, collections, operating requirements, and performance reporting should follow a common framework to reduce due-diligence costs and support consistent monitoring.
- **Dedicated project revenues:** Portfolio revenues should be kept in dedicated project accounts and used in a set order: first for operating costs, then debt payments and reserves, and finally distributions to project sponsors.
- **Completion support:** Sponsors should retain construction, cost-overrun, and commissioning risk until the portfolio meets agreed completion and operating-readiness tests.
- **Refinancing thresholds:** Access to longer-tenor debt should depend on a minimum operating record and demonstrated performance against utilization, collections, uptime, and debt-service requirements.

Global case study in practice

In 2026, Fastned secured a green loan facility of up to €200 million from a consortium of banks to finance charging stations, capacity upgrades, and site development across Belgium and Switzerland. The five-year facility was structured without recourse to the parent company and financed multiple assets through a common platform. The transaction shows how an established charging portfolio can use operating performance and aggregated cash flows to access bank debt beyond sponsor balance-sheet capacity.[21]

Public-Private Partnerships

What It Is

Public-private partnerships (PPPs) provide a structured mechanism for government and private-sector partners to jointly deploy charging infrastructure by allocating investment, responsibilities, and risks to the parties best positioned to manage them. Under a PPP, a public authority can contract a private charging operator to finance, design, build, operate, and/or maintain infrastructure under a long-term agreement. The public contribution may include land or site

access, permitting support, grid-enabling works, capital grants, viability-gap funding, or recurring service payments. The private partner can provide technical delivery, operations, and some or all of the project capital. The appropriate PPP structure depends on market maturity, expected utilization, and the level of private capital the project can support:

- **Operations and maintenance:** Government finances and owns the infrastructure, while a private operator manages service delivery. This suits early-stage markets where private capital is limited.
- **Hybrid annuity:** Government and the private operator share capital costs, while fixed payments compensate the operator and leave most utilization risk with the government.
- **Build-operate-transfer:** The private partner finances, operates, and maintains the infrastructure, recovers its investment through user revenue, and transfers the assets to the government at the end of the concession.
- **Full private ownership:** The operator finances, owns, and manages the infrastructure and retains user revenue. This is most suitable where demand and revenues are sufficiently predictable.

What It Solves

Public charging requires high up-front investment but may generate weak early revenues, particularly at strategic sites deployed ahead of demand. A PPP addresses this gap by combining public support with private delivery: the government manages enabling conditions and early demand risk, while the private partner assumes construction and operating risk under defined service standards. Public-private partnerships for project finance can also allow government to meet broader EV-related objectives, including geographic coverage, accessibility, interoperability, uptime, and service quality. Private partners can then compete on the cost and quality of delivering those outcomes, allowing public objectives to be incorporated into infrastructure deployment while leveraging private capital and operational capability

Key Design Considerations

- **PPP model:** Operations-and-maintenance or hybrid-annuity structures are more suitable for early deployments with uncertain utilization. Build-operate-transfer structures become more viable on proven routes where user revenue can support private capital recovery. Depending on the structure, the public sector can contribute land or site access, enabling infrastructure, capital support, concessional finance, revenue support, or other incentives, while private partners can finance, design, install, operate, and maintain the charging infrastructure.
- **Market fit:** PPP delivery is best suited to strategic public charging sites deployed ahead of commercial demand. In Nigeria, state transport authorities could contract private operators, with DisCos supporting connections and regulators overseeing service and tariff conditions. The public authority should retain risks linked to land, approvals, and public-service requirements, while the private partner remains responsible for financing commitments, delivery, technology performance, and operations.
- **Revenue structure:** User charges can be combined with availability or annuity payments where merchant revenue is insufficient. Public payments should cover contracted service

rather than guarantee the operator's full commercial return. Payments should be tied to defined charging capacity, uptime, maintenance, safety, and data-reporting requirements, with deductions for underperformance.

- **Market transition:** Contract structures should shift more capital and revenue risk to private operators as utilization becomes established and operating data improves**.**

Global case study in practice

Gloucestershire County Council is procuring public charging through a 15-year concession in which the private operator finances, installs, operates, and maintains the chargers, supported by public grant funding. The operator recovers costs through user fees and shares revenue with the council, providing a practical build-own-operate model for sites with commercial demand. The model demonstrates how government can combine access to public sites and targeted public funding with private investment and long-term operating responsibility.[22]



Conclusion

Scaling Nigeria's charging infrastructure will require policy and finance to work in tandem, with coordinated action across government and industry. Exhibit 10 highlights the range of actors needed to support market development.

Exhibit 10: Institutional responsibilities across Nigeria's charging value chain



Policy can address structural barriers that constrain project viability through a clear national roadmap, targeted capital incentives, fit-for-purpose tariffs, access to land, streamlined approvals, and common technical standards. These measures can collectively lower deployment costs and establish more predictable conditions for investment.

Finance can then address the remaining commercial risks that constrain capital deployment. Early projects will require mechanisms that improve revenue certainty and reduce investor exposure, including demand- and revenue-based contracts, charging-as-a-service models, and others covered in this report. As utilization strengthens and project economics mature, portfolio aggregation, project finance, and public-private partnerships can support access to larger pools of long-term capital. This progression can help move charging infrastructure from reliance on early-stage support toward a more investable and scalable market.

No single institution or intervention can deliver this transition independently. Government agencies and regulators will need to establish the enabling framework, DisCos will need to prepare networks and deliver connections, operators and vehicle providers will need to coordinate infrastructure with vehicle deployment and demand, and commercial and development-finance institutions will need to provide capital appropriate to different stages of market maturity. Exhibit 11 sets out what each is responsible for delivering.

Exhibit 11: Institutional roles for scaling charging infrastructure in Nigeria

Institution	Role In Charging Infrastructure Delivery
Presidential Initiative on Compressed Natural Gas and Electric Vehicles (PI-CNG & EV)	Lead national coordination of the EV and charging infrastructure agenda, develop a coordinated deployment roadmap, convene relevant federal and state institutions, and align public interventions across clean-mobility programs.
National Automotive Design and Development Council (NADDC)	Provide vehicle-market, production, and adoption inputs for charging planning; integrate charging requirements into automotive and EV policy; recommend industry incentives; and coordinate with vehicle manufacturers and assemblers on expected EV deployment.
Federal Ministry of Transportation	Integrate charging infrastructure requirements into national transport planning, including major transport corridors, terminals, and public transport infrastructure, and coordinate charging deployment with broader transport-sector policies and investments.
Federal Ministry of Power	Provide power-sector policy direction for EV charging and coordinate grid development requirements for charging infrastructure for broader power-sector planning, investment, and distributed energy policy.
Nigerian Electricity Regulatory Commission (NERC)	Establish electricity-sector regulatory treatment for EV charging within its jurisdiction, including relevant tariff, metering, electricity-sale, and connection frameworks.

State Electricity Regulators	Apply the national framework within transitioned markets, approve local tariff and connection arrangements, determine network-cost recovery, and incorporate charging demand into distribution planning.
Electricity Distribution Companies (DisCos)	Assess connection capacity, define technical and network-upgrade requirements, provide connection cost and delivery estimates, and incorporate material charging loads into distribution-network planning.
Standards Organisation of Nigeria (SON)	Establish product, safety, communication, and interoperability standards for charging equipment and battery-swapping systems, with compliance linked to market access and public support.
Nigerian Electricity Management Services Agency (NEMSA)	Enforce applicable electrical technical and safety requirements and inspect, test, and certify charging-site electrical installations, meters, and associated electrical infrastructure before use.
State Transport Authorities	Identify priority charging locations, aggregate public and commercial fleet demand, provide public land where appropriate, and procure private operators for publicly supported infrastructure.
Charging Operators, Fleet Owners, and Vehicle Providers	Provide deployment and load forecasts, commit demand where feasible, finance site-level assets, and report operating data needed for planning and regulatory oversight.
Rural Electrification Agency (REA)	Support distributed energy solutions where conventional grid reinforcement is uneconomic or unable to provide the required service level.
National Environmental Standards and Regulations Enforcement Agency (NESREA)	Enforce applicable environmental requirements for charging and battery infrastructure, including requirements related to battery handling, collection, recycling, and end-of-life management under Nigeria's environmental regulatory framework.
Infrastructure Concession Regulatory Commission (ICRC) and State Public-Private Partnership Units	Support project preparation, procurement, risk allocation, and contractual design for publicly supported charging concessions.
Charging and Swapping Operator	Develop, finance, install, operate, and maintain charging and swapping infrastructure; provide site, utilization, load, uptime, and operational data for infrastructure and grid planning; comply with applicable technical, safety, interoperability, and reporting requirements; and coordinate with DisCos on connections and future load requirements.
Fleet Operator	Analyze vehicle movement and traffic patterns to help identify priority charging locations; coordinate vehicle rollout with charging infrastructure deployment; and share relevant data on vehicle utilization, routes, dwell times, battery characteristics, charging

	requirements, and other operational needs to inform infrastructure planning and siting.
Commercial Banks	Provide commercial debt, equity, project/portfolio financing, refinancing, and eventually capital markets funding for sufficiently bankable infrastructure.
Development Financial Institutions	Provide concessional/catalytic capital, guarantees, risk-sharing facilities, viability-gap support, technical assistance, and project-preparation funding to help early projects reach commercial bankability.

Nigeria has an opportunity to build a charging ecosystem that grows in step with its electric mobility ambitions. The priority now is to establish the policy, financing, technical, and institutional foundations that enable the right infrastructure to be deployed in the right places, at the right time**.** With coordinated action across actors, Nigeria can translate growing market momentum into a reliable, accessible, and commercially sustainable charging network, positioning the country to support EV adoption at scale and emerge as a leading electric mobility market in Africa.



Appendix

Exhibit 9: Assumed charging mix by vehicle type and use case

Segment	Charging type	2W (%)	3W (%)	4W (%)
Private	Level 1 AC (socket)	90	20	0
Private	Level 2 AC (home)	0	0	50
Private	Level 2 AC (public)	0	0	25
Private	DC fast charging	0	0	25
Private	Battery swap	10	80	0
Commercial	Level 1 AC (socket)	10	10	0
Commercial	Level 2 AC (depot)	0	0	50
Commercial	Level 2 AC (public)	0	0	20
Commercial	DC fast charging	0	0	30
Commercial	Battery swap	90	90	0

Exhibit 10: Energy and fuel price assumptions

Item	Unit	Base price	Annual escalation (%)
Band A tariff	NGN/kWh	209	1
Public AC (Level 2)	NGN/kWh	275	1
DC fast charging (Level 3)	NGN/kWh	350	1
Battery swap, 2W and 3W (implied)	NGN/kWh	1,111	1
Gasoline	NGN/litre	1,300	1
Diesel	NGN/litre	1,500	1

Exhibit 11: Vehicle-to-infrastructure ratios used to derive charging requirements

Ratio	Vehicles per unit
Public charging points, 4W	40
Battery swapping facilities, 2W	155
Battery swapping facilities, 3W	55

Exhibit 12: ICE and EV vehicle assumptions used in the TCO comparison

Parameter	Unit	2W ICE	2W EV	3W ICE	3W EV	4
Purchase price	NGN	1,200,000	1,440,000	2,500,000	3,200,000	14,(
Annual mileage	km	12,000	12,000	18,000	18,000	
ICE fuel economy	km/L	45		28		
EV energy use	kWh/100km		2		9	
EV battery size	kWh		2		5	
Insurance	% of value	4	4	4	4	
Maintenance	NGN/km	7	3	18	5	
FRSC registration	NGN/yr	5,000	5,000	25,000	25,000	
Residual value	% at EOL	0	0	25	20	
Battery replacement year	year		6		4	

Exhibit 13: Annual mileage assumptions by segment and use case

Segment	Passenger (km/yr)	Commercial (km/yr)
2W	12,000	24,000
3W	18,000	30,000
4W	15,000	45,000

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