Clean Technology Hub
Energy Innovation Centre

White Paper

Battery Recycling Scheme in Nigeria

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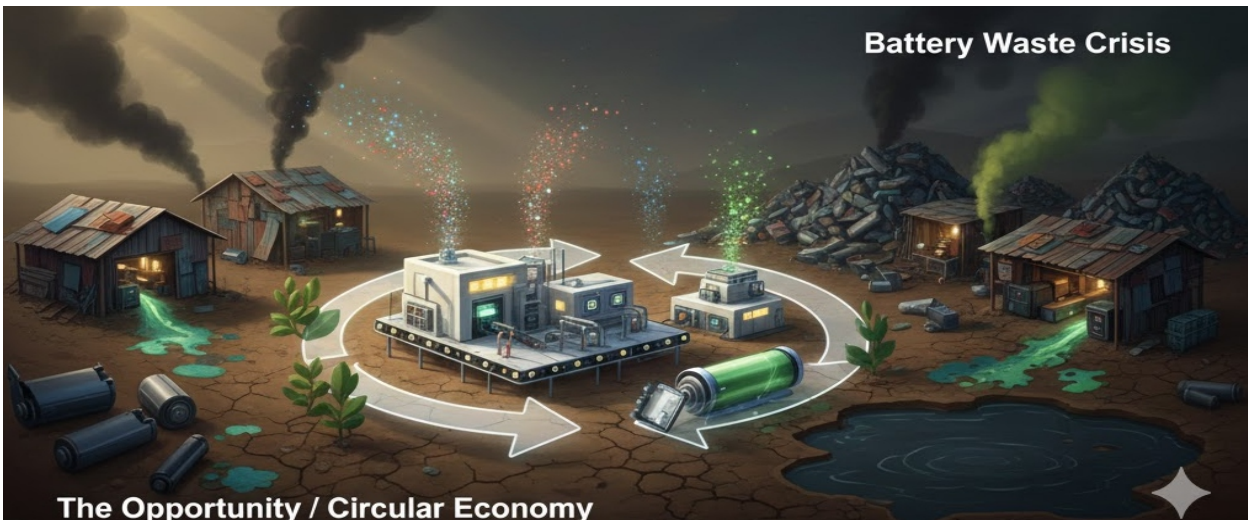
1. Executive Summary

Nigeria's energy transition is accelerating, powered by the rapid uptake of solar home systems, mini-grids, telecom power solutions, and an emerging e-mobility sector. At the center of this shift are batteries, particularly lead-acid and lithium-ion, which have become indispensable to ensuring reliable access to energy. Yet as deployment expands, so too does a parallel crisis: the rise of waste batteries, often managed through unsafe, informal practices that threaten public health, contaminate the environment, and squander valuable resources.

Today, the majority of used batteries in Nigeria end up in the informal sector, where scrap collectors and backyard smelters dismantle and process them under hazardous conditions. These activities release toxic lead and other heavy metals into the air, soil, and water, exposing vulnerable communities, especially women and children, to long-term health risks. Without decisive intervention, the scale of this problem will continue to grow in direct proportion to Nigeria's renewable energy ambitions.

At the same time, battery recycling presents a unique opportunity. Globally, the recycling market is projected to surpass USD54.3 billion by 2030[1], and Nigeria is well placed to capture a share of this growth. Establishing a formal recycling framework could create thousands of green jobs, attract investment, reduce dependence on raw material imports, and enable the recovery of critical minerals such as lead, lithium, cobalt, and nickel. Far from being a burden, battery waste could become a cornerstone of Nigeria's circular economy, turning environmental risk into an industrial opportunity.

This white paper examines the current state of Nigeria's battery landscape, the scale of its end-of-life challenge, and the lessons that can be drawn from other African countries that have formalized recycling systems. It also highlights the economic, environmental, and social benefits of building a safe and inclusive recycling sector. Ultimately, the paper calls for coordinated action: policymakers must enforce stronger regulations and adopt global best practices, industry must integrate recycling into supply chains, investors and donors must support scalable infrastructure and innovation, and civil society must drive awareness and accountability.



[1] MarketsandMarkets. (2024). *Battery recycling market by chemistry, source, end use, and region – global forecast to 2030*. MarketsandMarkets. https://www.marketsandmarkets.com/Market-Reports/battery-recycling-market-147696175.html

2. Introduction

The purpose of this white paper is to make the case for formalizing Nigeria's battery recycling sector, with emphasis on developing a safe, efficient, and investment-friendly system to manage end-of-life energy storage. As Nigeria presses forward with its energy transition agenda, driven by targets for renewable generation, decentralized energy, and improved energy access, batteries are becoming increasingly central to powering households, businesses, and community infrastructure.

Global demand and use of batteries is on the rise, with an estimated USD143.94 billion in 2024 and is projected to reach USD581.35 billion by 2032.[2] Li-ion batteries are especially in high demand, as they are lighter and more durable. As the number of end-of-life batteries rises, countries worldwide are implementing regulations and investing in new technologies to build circular economies for battery materials.

Battery demand in Nigeria is surging, driven primarily by the country's unreliable power grid, which has made batteries an essential alternative power source for homes, businesses, and critical infrastructure. The market is experiencing rapid growth, With market analyses projecting sustained expansion over the next decade, Nigeria's battery industry is poised to play a critical role in the region's clean energy transition[3]. Several key sectors are contributing to this increased demand, fueling growth in different battery technologies. These factors have led to an estimated 1.1 million metric tons of e-waste generated annually, of which 100,300 tonnes come from the transport sector[4].

The scale of deployment suggests that without structured interventions, battery waste will grow rapidly, adding substantial environmental, health, and economic burdens. While precise forecasts of battery waste volumes in Nigeria are non-existent with no reliable forecasts of the volume of waste generated, the upward trend in Solar Home Systems (SHS) units, solar capacity, mini-grid adoption, and growth in off-grid solar product sales (for example, about 628,000 solar/off-grid units were sold in a recent year) indicate that waste volumes will follow suit[5].

This white paper focuses on the full life cycle of major storage systems currently deployed in Nigeria—lead-acid batteries, lithium-ion batteries, and other emerging storage technologies. It examines both the risks posed by end-of-life batteries and the opportunities, from material recovery and health protection to regulatory frameworks and investment potential, that can help build a circular economy around batteries.

[2] Fortune Business Insights. (2025). *Battery Market Size, Share, Growth & Global Report [2032]*. Retrieved from https://www.fortunebusinessinsights.com/battery-market-105615 Fortune Business Insights
[3] Mordor Intelligence. (2024). *Nigeria battery market – growth, trends, COVID-19 impact, and forecasts (2024–2029)*. Mordor Intelligence. https://www.mordorintelligence.com/industry-reports/nigeria-battery-market
[4] Salifu, F. (2025, April 2). *Unlocking Nigeria's E-waste Potential for Industrial Growth, Sustainability*. NatureNews Africa. Retrieved from https://naturenews.africa/unlocking-nigerias-e-waste-potential-for-industrial-growth-sustainability/
[5] Oladipo, O. (2022, August 2). Nigeria grows sales of solar products by 38% to 628,000 in one year. BusinessDay. https://businessday.ng/energy/article/nigeria-grows-sales-of-solar-products-by-38-to-628000-in-one-year/

3. The Battery Landscape in Nigeria

3.1. Market Overview

Nigeria's battery market is expanding rapidly, shaped by the combined effects of off-grid energy solutions, mini-grids, telecommunications infrastructure, and the early signals of electric mobility adoption. Solar deployment remains the single strongest driver of demand. Between 2019 and 2022, the Rural Electrification Agency (REA) deployed about 1 million solar home systems (SHS), providing electricity to roughly 5 million Nigerians across the six geopolitical zones[6]. Each of these systems relies on batteries for energy storage, underscoring how central batteries have become to Nigeria's renewable energy expansion. Alongside SHS, the rollout of hundreds of mini-grids backed by the World Bank, REA, and private developers has deepened demand for reliable storage to balance loads and ensure resilience.

Telecommunications and digital infrastructure also represent a significant and longstanding source of demand. Nigeria hosts more than 30,000 telecom towers[7], most of which require battery backup to ensure uptime during chronic grid outages. Historically, this sector has relied heavily on lead-acid batteries, although operators are increasingly experimenting with lithium-ion for longer service life and reduced maintenance. A newer but rapidly growing demand segment is electric mobility. Pilot programs introducing electric motorcycles and three-wheelers for ride-hailing and logistics are gaining momentum, particularly in Lagos and Abuja, with regional market growth in West Africa projected to accelerate lithium-ion demand in the next decade[8].

The Nigerian market is characterized by a mix of battery chemistries. Lead-acid batteries, both flooded and sealed (VRLA: Valve Regulated Lead Acid), remain the most widely used because of their low cost and accessibility. Their expected lifespan in Nigeria averages three to seven years, though poor maintenance and hot climate conditions often shorten this further[9]. By contrast, lithium-ion batteries, particularly lithium iron phosphate (LFP) and nickel manganese cobalt (NMC) chemistries, are increasingly deployed in higher-end home systems, mini-grids, telecom installations, and the emerging e-mobility market. These typically last eight to fifteen years, depending on cycling and chemistry[10]. Other storage solutions, such as small-format consumer batteries, sealed lead variants, and early-stage flow battery pilots, are beginning to appear but remain marginal compared to lead-acid and lithium-ion.

[6] Okonkwo, O. (2022, November 22). *Rural Electrification Agency says it has achieved 1 million solar home systems connections between 2019 to 2022*. Nairametrics. https://nairametrics.com/2022/11/22/rural-electrification-agency-says-it-has-achieved-1-million-solar-home-systems-connections-between-2019-to-2022/
[7] Aragba-Akpore, S. (2025, February 12). *Power and telecom services*. ThisDay. https://www.thisdaylive.com/2025/02/12/power-and-telecom-services/
[8] Africa E-Mobility Alliance. (2024). *Africa e-mobility market outlook 2024*. Africa E-Mobility Alliance.
[9] International Renewable Energy Agency. (2022, April). Global Battery Storage Outlook. https://www.irena.org/publications/2022/Apr/Global-Battery-Storage-Outlook
[10] International Energy Agency. (2023). Global EV Outlook 2023. IEA. https://www.iea.org/reports/global-ev-outlook-2023

In terms of market size, Nigeria is one of the continent's largest battery economies. The African lead-acid battery market was valued at US$1.9 billion in 2024, with Nigeria estimated to account for nearly one-fifth of this demand[11]. Most of Nigeria's supply is met through imports, with at least 132,000 units imported in 2021 alone[12]. While the formal market includes registered importers, branded distributors, solar installers, and telecom/utility procurement, a large portion of circulation occurs informally through second-hand imports, cross-border flows, and local resale markets. Informal actors also dominate end-of-life handling and "recycling" using unsafe methods such as acid dumping and open burning, which pose severe health and environmental risks[13].

3.2. Current End-of-Life Situation

Nigeria's battery waste is growing rapidly, with millions of lead-acid and lithium-ion units reaching end-of-life each year. End-of-life batteries are overwhelmingly handled through informal channels. Over 80% of e-waste, including batteries, is handled by the informal sector through unsafe burning and acid leaching, releasing lead, sulphuric acid, and heavy metals into the environment[14]. Scrap collectors, backyard smelters, unlicensed dismantlers, and small-scale recyclers dominate the landscape. Many of these actors do not have access to proper tools or safety equipment, they manually break battery casings, drain acids into open ground or watercourses, and extract metallic components in rudimentary smelters or by informal melting. Studies from both the lead-acid and lithium-ion segments show that much of the dangerous work, acid handling, plate separation, pure-metal smelting is carried out without environmental or occupational health controls[15].

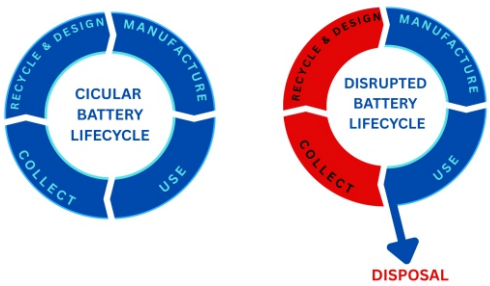


Fig. 1.0 CIRCULAR AND DISRUPTED BATTERY LIFE CYCLE

[11] Mordor Intelligence. (2024). Africa lead-acid battery market – growth, trends, Covid-19 impact, and forecasts (2024–2029). Mordor Intelligence. https://www.mordorintelligence.com/industry-reports/africa-lead-acid-battery-market
[12] World Integrated Trade Solution (2021). Nigeria Lead-acid electric accumulators of a kind used imports by country in 2021. https://wits.worldbank.org/trade/comtrade/en/country/NGA/year/2021/tradeflow/Imports/partner/ALL/product/850710.
[13] United Nations Environment Programme. (2023). *Sustainability and unlicensed lead battery recycling: A global assessment of health, environment and socio-economic impacts*. UNEP. https://www.unep.org/resources/report/sustainability-unlicensed-lead-battery-recycling
[14] iTelemedia. (2025, May 27). 2025 outlook: E-waste recycling and what it means for Nigerians. iTelemedia. https://itelemedia.com/2025-outlook-e-waste-recycling-and-what-it-means-for-nigerians/
[15] Ebii, C. (2021, December 10). *Developing the renewable energy sector responsibly: Establishing a regulatory framework for battery waste management in Nigeria*. Heinrich Böll Stiftung Nigeria. https://ng.boell.org/en/2021/12/10/developing-renewable-energy-sector-responsibly-establishing-regulatory-framework-battery

Fig. 1.1 E-waste dumping site[16].

The environmental and health consequences are serious and already visible in many communities. Toxic chemicals including lead, mercury, cadmium, and sulphuric acid are often released into the soil, waterways, and air. For example, NESREA and other agencies report increasing incidences of soil and water contamination around informal battery recycling locations, and recurring problems of respiratory illnesses, neurological damage, and elevated lead exposure, especially among children living nearby[17]. Health studies also document skin diseases, eye irritation, kidney damage, and in some cases developmental impacts in children whose households are close to or work in informal recycling sites[18].

Despite government regulatory attempts, major gaps in collection, traceability, and formal recycling infrastructure remain. Collection of used batteries is often ad hoc with no standard drop-off or buy-back network; while traceability of battery flows from user to collector to final dismantler or smelter is virtually nonexistent. Formal recycling facilities that exist are few, often under-equipped, with inadequate pollution control or worker protection, especially when informal operators subcontract or bypass regulation[19]. Pilot efforts have attempted to formalize informal collectors (in Lagos and elsewhere), but reach remains limited. Many informal collectors are unaware of the hazards, or cost and logistical barriers prevent full compliance[20].

[16] eTerra Technologies. (2023). *Top 20 countries that serve as dumping grounds for trash*. eTerra Technologies. https://www.eterra.com.ng/system/articles/top-20-countries-dumping-grounds-trash/
[17] Mojeed, A. (2025, March 21). *Nigeria govt pledges to enforce battery recycling laws amidst health, environmental concerns*. AllAfrica. https://allafrica.com/stories/202503210020.html
[18] Manhart, A., & Schleicher, T. (2017). *Managing hazardous battery waste from off-grid solar systems in Africa: Drawbacks and strategies for improvement*. *International Journal of Environmental Research and Public Health, 14*(8), 911. https://doi.org/10.3390/ijerph14080911
[19] Ebii, C. (2021, December 10). *Developing the renewable energy sector responsibly: Establishing a regulatory framework for battery waste management in Nigeria*. Heinrich Böll Stiftung Nigeria. https://ng.boell.org/en/2021/12/10/developing-renewable-energy-sector-responsibly-establishing-regulatory-framework-battery

3.3 Current e-waste management scheme in Nigeria and existing policies

The Nigerian government has recently taken significant steps to formalize battery recycling, disposal, and regulation through the National Environmental (Battery Control) Regulations 2024, which covers the entire battery lifecycle, production, use, collection, storage, recycling, and disposal, while introducing extended producer responsibility (EPR)[21] requirements for manufacturers and importers. The National Environmental Standards and Regulations Enforcement Agency (NESREA) now leads enforcement of battery-related regulations in Nigeria, supported by initiatives such as the Alliance for Responsible Battery Recycling (ARBR), which operates as a Producer Responsibility Organization (PRO) under the Extended Producer Responsibility (EPR) framework.

Nigeria's battery management framework is anchored in the National Environmental (Battery Control) Regulations, 2020, which establish EPR as the central compliance mechanism. Key provisions include mandatory registration of all producers, importers, and recyclers; licensing requirements for collection and recycling facilities; and standards for the safe storage, transport, and treatment of used batteries. The regulations also assign explicit responsibilities to PROs for take-back and collection schemes, require annual performance reporting, and impose penalties—including fines of at least ₦2 million—for violations such as illegal disposal or export of hazardous battery waste. Complementing this is the National Policy on Waste Battery Management (2021), which promotes a circular economy approach emphasizing lifecycle responsibility, local recycling capacity development, and pollution prevention from end-of-life batteries.

Despite these frameworks, compliance remains low, with only about 128 firms currently registered under the battery control regulations, and widespread informal activity continuing to dominate the value chain. Unsafe recycling practices—particularly of used lead-acid batteries—persist among informal operators, leading to toxic emissions, soil and water contamination, and severe public health impacts. Public awareness of proper disposal remains limited, enforcement capacity is weak, and Nigeria still lacks sufficient licensed recycling infrastructure capable of processing the growing battery waste stream.

[20] Daily Trust. (2023, July 2). *Living on borrowed time: How Nigeria's unchecked e-waste is poisoning residents, environment*. Daily Trust. https://dailytrust.com/living-on-borrowed-time-how-nigerias-unchecked-e-waste-is-poisoning-residents-environment/

[21] Federal Republic of Nigeria. (2020). *National Environmental (Battery Control) Regulations, Statutory Instrument No. 10 of 2020*. United Nations Environment Programme – Law and Environment Assistance Platform (LEAP). https://leap.unep.org/en/countries/ng/national-legislation/national-environmental-battery-control-regulations-statutory

The limited success of existing interventions can be attributed to weak institutional coordination, inconsistent enforcement, and insufficient financial and technical incentives for formal recyclers. Many producers and importers regard EPR compliance as costly and bureaucratic, while informal collectors and smelters continue to operate with little deterrence. Additionally, fragmented data on waste flows impedes effective monitoring, and a shortage of domestic recycling technology constrains scale-up of formal recovery systems. The EPR model, though promising, remains in its infancy—with most producers yet to establish functioning collection or take-back systems. Consequently, the informal sector remains the backbone of Nigeria's battery recycling economy, undermining the objectives of both environmental protection and circular value creation.

Nonetheless, there are encouraging signs. Recent investments, such as a $1.5 million initiative to establish advanced lithium-ion and lead-acid recycling facilities in Lagos, signal renewed momentum. International cooperation—most notably the Nigeria–Germany partnership on responsible battery recycling—is also strengthening local technical capacity and aligning national standards with global best practices.

4. Opportunities in Battery Recycling

Nigeria's growing renewable energy and e-mobility sectors are rapidly expanding the demand for energy storage systems, resulting in an equally urgent need to manage end-of-life batteries sustainably. While improper disposal poses serious environmental and health risks, the recycling of used batteries presents a high-value opportunity to recover critical materials, create green jobs, and attract both domestic and foreign investment. A structured and well-regulated recycling ecosystem could transform what is currently viewed as waste into a driver of economic growth, environmental protection, and social development within Nigeria's circular economy transition.

4.1. Economic Opportunities

Battery recycling presents a significant economic frontier for Nigeria, with potential to create thousands of jobs across the collection, transportation, dismantling, smelting, and material recovery segments of the value chain. Globally, the battery recycling market is projected to grow from USD23.2 billion in 2023 to USD54.3 billion by 2032 at a Compound Annual Growth Rate (CAGR) of over 10%[22]. With Nigeria's rising consumption of both lead-acid and lithium-ion batteries, the country could attract a share of this market by developing local recycling industries.

Recovered materials such as lead, lithium, cobalt, nickel, and plastics are high-value commodities in global supply chains, especially for battery and electronics manufacturers. For instance, over 95% of lead from used lead-acid batteries can be recovered and reused, making it one of the most successfully recycled products worldwide[23]. Establishing efficient recycling infrastructure in Nigeria, building on existing formalized efforts such as the National Environmental (Battery Control) Regulations (2020), the National Policy on Waste Battery Management (2021), and the operations of private recyclers like Hinckley Recycling, E-Terra Technologies, and the Alliance for Responsible Battery Recycling (ARBR)—could significantly reduce dependence on raw material imports, conserve foreign exchange, and open opportunities for the export of recovered metals. Beyond direct revenue, the sector can catalyze broader value-chain development, from logistics and collection systems to advanced manufacturing, while attracting foreign direct investment from companies seeking sustainable and ethically sourced materials.

4.2. Environmental Opportunities

Battery recycling directly addresses one of Nigeria's most pressing environmental challenges: toxic waste leakage. Informal recycling of lead-acid batteries is known to cause widespread contamination of soil and water with lead and sulfuric acid, while unsafe disposal of lithium-ion batteries risks fire hazards and heavy metal leaching. By establishing formal recycling systems, Nigeria can drastically reduce pollution hotspots and mitigate long-term ecosystem damage.

More broadly, battery recycling aligns with the Federal Government's decarbonization commitments and international climate goals. A robust recycling sector supports a circular economy, reducing the need for new mining of critical minerals and lowering greenhouse gas emissions associated with primary extraction. For example, recycling metals such as cobalt and nickel consumes significantly less energy than mining them from virgin ores, thereby contributing to emission reductions in line with Nigeria's Nationally Determined Contributions (NDCs) under the Paris Agreement.

[22] Precedence Research. (2024). *Battery recycling market – trends, size, share, growth, and forecasts, 2024–2033*. Precedence Research. https://www.precedenceresearch.com/battery-recycling-market
[23] United States Environmental Protection Agency. (2024, May 15). *Used lead-acid batteries*. U.S. EPA. https://www.epa.gov/recycle/used-lead-acid-batteries

4.3. Social Opportunities

Formalizing the battery recycling sector also carries important social benefits. Today, much of Nigeria's battery waste is handled by informal collectors and backyard smelters, exposing vulnerable groups including women and children to toxic lead dust and fumes. Studies in comparable African contexts have shown that nearly 100% of children living near informal recycling sites are at risk of elevated blood lead levels, with severe long-term health consequences[24].

By creating safer, regulated recycling systems, Nigeria can protect these groups while also offering pathways to formal employment and income security for current informal recyclers. In parallel, the public health improvements through reduced exposure to hazardous substances will yield long-term social and economic dividends by lowering healthcare costs and improving productivity. Communities once burdened by toxic waste sites could instead become centers of sustainable industry, helping shift perceptions of recycling from a hazardous informal practice to a respected, opportunity-rich sector.

[24] Tsydenova, O., & Bengtsson, M. (2011). *Chemical hazards associated with treatment of waste electrical and electronic equipment. Waste Management, 31*(1), 45–58. https://doi.org/10.1016/j.wasman.2010.08.014

5. Measures Required to Support Battery Recycling

Achieving an efficient and sustainable battery recycling ecosystem in Nigeria will require coordinated policy, institutional, and market interventions. Current efforts remain fragmented, with limited infrastructure, weak enforcement, and inadequate financial incentives for formal operators. To unlock the sector's potential, Nigeria must strengthen regulatory implementation, expand collection and recycling capacity, promote research and innovation, and foster partnerships that integrate the informal sector into formal value chains. Building a robust ecosystem that supports safe recovery, reuse, and recycling will not only safeguard the environment but also catalyze industrial growth and circular economy development.

5.1 Regulatory & Policy Framework

A robust regulatory and policy framework is central to the success of Nigeria's battery recycling scheme. Previous regulations, though well-intentioned, have been hindered by weak enforcement, limited industry awareness, and inadequate incentives for compliance. The proposed framework seeks to address these gaps by establishing clearer accountability mechanisms, introducing fiscal and market-based incentives for recyclers, and promoting public-private coordination to ensure traceability across the battery value chain. These measures aim to make compliance both practical and profitable, driving more effective and sustainable outcomes.

5.2 Extended Producer Responsibility (EPR) for Battery Manufacturers and Importers

EPR should be the cornerstone of the policy framework, mandating that battery producers and importers take financial and operational responsibility for the entire lifecycle of their products, including collection, transport, and end-of-life recycling. All stakeholders placing batteries on the market—including producers, importers, and major distributors—should be required to register with a Producer Responsibility Organization (PRO). They must contribute proportionately to recycling funds and meet annual collection and recovery targets based on the volumes they introduce into the market. Importers and distributors, in particular, should ensure that products entering Nigeria comply with national recycling standards and are traceable through labeling or take-back systems. Non-compliance should attract strict penalties, while compliant entities benefit from reputational advantages, preferential access to government contracts, and eligibility for green financing instruments.

5.3 Standards for Collection, Transport, Storage, and Recycling

National standards should be developed and enforced by the National Environmental Standards and Regulations Enforcement Agency (NESREA) in collaboration with the Standards Organisation of Nigeria (SON). These standards will cover the safe collection, labeling, packaging, and transport of batteries to minimize risks during handling. Storage guidelines will establish requirements for temperature control, fire suppression systems, and segregation of battery types. Recycling plants will be mandated to adopt best-available technologies to recover materials efficiently while minimizing emissions and hazardous waste. Regular audits and certifications will ensure compliance with both domestic regulations and international conventions such as the Basel Convention.

5.4 Tax Incentives and Economic Instruments

To attract private-sector participation and drive investment in recycling infrastructure, the government should introduce targeted economic incentives. These may include:

1. Tax credits and duty exemptions on the importation of recycling equipment and technologies.
2. Reduced corporate tax rates for companies meeting collection and recycling targets.
3. Subsidies or rebates for firms integrating secondary raw materials (recovered lithium, cobalt, or lead) into local production.
4. Green bonds and concessional financing to support large-scale recycling facilities.

These incentives will not only lower the cost of compliance but also stimulate innovation, promote technology transfer, and create a competitive domestic recycling industry.

Policy Harmonization and Multi-Sectoral Coordination

Finally, the framework will require strong coordination between NESREA, SON, the Federal Ministry of Environment, customs authorities, and industry stakeholders. Aligning policies across energy, trade, and health sectors will reduce duplication and strengthen enforcement. International partnerships will also be leveraged to ensure Nigeria's recycling policies remain globally competitive and aligned with evolving standards in renewable energy and e-mobility.

Public Awareness and Education

Public awareness and education are vital pillars of an effective battery recycling scheme. Without strong community participation and behavioral change, even the best regulatory and infrastructure systems risk underperformance. In Nigeria, where informal recycling is deeply entrenched and awareness of safe disposal is low, deliberate and sustained efforts are required to build a culture of responsible battery management.

National Campaigns on Safe Disposal of Batteries

The government, in partnership with Producer Responsibility Organizations (PROs), industry players, and civil society, should roll out nationwide campaigns to sensitize the public on the environmental and health dangers of improper battery disposal. These campaigns should emphasize practical actions where to drop off used batteries, the incentives available, and the benefits of recycling. Messaging should be localized in Nigeria's major languages (Hausa, Yoruba, Igbo, and Pidgin English) to ensure broad inclusivity. Digital platforms, billboards, radio jingles, and grassroots mobilization through town halls can all reinforce consistent messaging.

Integration into School Curriculums and Community Programs

Embedding battery recycling concepts into school science, civic education, and environmental studies will instill responsible habits from an early age. Schools can also serve as collection points, reinforcing the message through practical action. Beyond formal education, community-based programs such as youth clubs, religious organizations, and local cooperatives should be engaged to spread knowledge and lead local initiatives. Training sessions and demonstrations can help communities understand the risks of informal recycling and the opportunities of formal schemes.

Collaboration with Media and Influencers

Media outlets, journalists, and social influencers play a critical role in shaping public opinion and behavior. Partnerships should be formed with TV and radio stations to air documentaries, talk shows, and investigative features on the consequences of unsafe recycling and the benefits of circular practices. Social media influencers, particularly those active in lifestyle, technology, and environmental advocacy, can amplify messages to younger audiences. Campaigns should highlight success stories of individuals or businesses contributing to safe battery recycling, positioning recycling as a modern, responsible, and aspirational practice.

By combining mass campaigns, structured education, and influencer-led storytelling, Nigeria can bridge the knowledge gap, dispel myths, and mobilize both urban and rural communities. This shift in public perception is essential to achieving high collection rates, reducing unsafe recycling practices, and embedding sustainability as a shared national value.

Financing and Business Model

Establishing a sustainable battery recycling scheme in Nigeria requires a carefully designed financing and business model that blends public support, private investment, and international climate finance. The model must ensure financial viability for operators, affordability for consumers, and long-term sustainability for the sector.

Government Grants and Subsidies

Government support will play a catalytic role in the early stages of the scheme. Grants and subsidies can reduce the high upfront capital costs of establishing certified recycling plants and nationwide collection systems. Specific measures may include import duty waivers for recycling equipment, startup grants for Producer Responsibility Organizations (PROs), and subsidized loans for firms investing in recycling infrastructure. By lowering barriers to entry, government intervention will attract more private-sector participants and accelerate market development.

Public–Private Partnerships (PPPs)

Given the scale of investment required, PPPs will be central to the business model. The government can provide land, tax incentives, and regulatory support, while private investors contribute capital, technology, and operational expertise. This shared-risk, shared-reward approach has proven effective in waste management sectors globally and can be replicated in Nigeria. Partnerships with telecom companies, power distributors, and battery manufacturers will also ensure integration of collection networks and recycling facilities into existing supply chains.

Carbon Credits and International Climate Funding

Battery recycling aligns with global climate goals by reducing emissions from mining, lowering energy demand, and preventing environmental degradation. Nigeria can leverage this by tapping into carbon credit markets under mechanisms such as the Clean Development Mechanism (CDM) and emerging Article 6 frameworks under the Paris Agreement. Additionally, climate-focused funds from institutions such as the Green Climate Fund (GCF), the Global Environment Facility (GEF), and bilateral donors can provide concessional finance to scale up recycling infrastructure, particularly for lithium-ion batteries critical to the renewable energy transition.

Revenue Streams from Recovered Materials

A strong commercial case exists for battery recycling. Valuable raw materials such as lead, cobalt, nickel, and lithium can be recovered and sold into domestic and international supply chains, reducing Nigeria's dependence on imports and supporting local industries. Sulphuric acid from lead-acid batteries can be neutralized and repurposed for industrial use, while plastics and other by-products can also generate secondary revenue. By creating predictable revenue streams, the recycling industry can become self-sustaining, offering investors attractive returns while simultaneously driving environmental and social benefits.

Sustainable Business Model

The long-term viability of the scheme lies in creating a circular economy where costs are shared, incentives are aligned, and value is retained locally. Producers and importers will contribute through EPR schemes, consumers benefit from incentives for returning used batteries, recyclers profit from recovered materials, and the government gains through reduced healthcare costs, job creation, and compliance with international agreements. This integrated model ensures that battery recycling evolves from a compliance-driven obligation into a thriving green industry.

6. Proposed Implementation Roadmap

Translating Nigeria's battery recycling ambitions into tangible outcomes requires a phased and coordinated roadmap that aligns policy, infrastructure, and market development. The proposed roadmap provides a structured pathway for action—outlining short-, medium-, and long-term priorities to strengthen regulatory enforcement, build recycling capacity, mobilize investment, and formalize the informal sector. By sequencing interventions strategically, Nigeria can move from fragmented initiatives toward a fully functional circular battery economy that supports national climate goals and industrial growth.

Timeframe	Key Actions	Objectives / Outcomes
Short-Term (1–2 years)	• Launch pilot collection points in Lagos & Abuja (schools, markets, filling stations, telecom outlets). • Establish 1–2 certified recycling plants for lead-acid and lithium-ion batteries.- • Implement public awareness campaigns and school-based education programs. • Develop partnerships with local waste management firms, battery manufacturers, and NGOs. • Collect data on battery volumes, consumer participation, and operational challenges.	• Test collection and recycling systems. • Build public awareness and participation. • Gather insights to inform nationwide scaling.
Medium-Term (3–5 years)	• Expand collection networks to major urban centers and high-traffic rural areas. • Construct additional certified recycling facilities in strategic hubs (Port Harcourt, Kano, Onitsha). • Strengthen regulatory enforcement and EPR compliance monitoring. • Launch digital platforms to track battery collection, recovery, and material flows. • Scale national awareness campaigns via media, influencers, and community programs.	• Nationwide coverage for battery collection and recycling. • Formalization of sector practices. • Improved operational efficiency and compliance.

Long-Term (5–10 years)	• Integrate battery recycling into broader municipal and national waste management systems. • Achieve near-complete formalization, phasing out unsafe informal recycling. • Establish a self-sustaining circular economy for batteries. • Leverage international partnerships, carbon credits, and climate financing for technology upgrades. • Position Nigeria as a regional leader in safe, profitable battery recycling.	• Full national integration and sustainability.- • Maximize environmental, economic, and social benefits. • Support green industrialization and renewable energy growth.

7. Conclusion and Call to Action

Nigeria is at a crossroads in its energy and environmental future. The rapid adoption of solar home systems, mini-grids, telecom infrastructure, and emerging electric mobility has driven exponential growth in battery demand. Without decisive intervention, this growth will translate into an escalating wave of hazardous waste, deepening environmental degradation, public health risks, and economic losses.

At the same time, battery recycling represents a powerful opportunity. By recovering valuable raw materials, creating thousands of green jobs, and reducing reliance on imports, Nigeria can transform a looming waste crisis into a driver of sustainable industrialization. A well-designed recycling ecosystem will protect vulnerable communities from toxic exposure, strengthen Nigeria's renewable energy ambitions, and align the country with global circular economy and climate commitments.

The moment to act is now. Success will require a whole-of-society effort:

1. **The Government** must enforce regulations, provide incentives, and lead with strong policies.
2. **Industry** must embrace Extended Producer Responsibility and integrate safe recycling into supply chains.
3. **Investors and donors** must support scalable infrastructure, technology, and innovation.
4. **Civil society and the public** must champion awareness, advocacy, and safe disposal practices.

By working together, Nigeria can move beyond the informal, unsafe recycling practices of today to build a modern, profitable, and socially inclusive battery recycling industry. This is not just about waste management; it is about seizing a strategic opportunity to build a circular economy, protect public health, and secure a cleaner, more resilient future for generations to come.