



COLUMBIA | SIPA

School of International and Public Affairs

Pioneering Nigeria's Carbon Exchange: NSIA Leading Africa's Market Transformation

Columbia University
Spring 2025 Capstone Project

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Outline

1. **Comparative Analysis of Carbon Credit Exchange Platforms**
 - a. **Case Studies:** China, Saudi Arabia, Malaysia, Singapore
 - b. **Key Learnings** for Nigeria's Carbon Exchange Platform
2. **Supply and Demand Analysis**
 - a. **Supply**
 - i. Nigeria's Supply Landscape for Carbon Credits
 - ii. Deep Dive into Seller- Buyer Alignment in the Nigerian Carbon Market
 - b. **Demand**
 - i. Buyer Landscape for Nigeria's Carbon Exchange Platform
 - ii. Deep Dive into International and Sovereign Buyers
 - c. **Key Learnings** for Nigeria's Carbon Exchange Platform
3. **Enabling the Carbon Exchange Platform**
 - a. **Phase 1:** Building and Design Carbon Exchange Platform
 - b. **Phase 2:** Global Market Access Depends on Credibility
 - c. **Phase 3:** Integrating Compliance Tools and Scaling the Exchange





SIPA Capstone Team & The Nigeria Sovereign Investment Authority (NSIA)

Doc. SIPA Capstone Team
Abuja, March 2025

The Nigeria Sovereign Investment Authority (NSIA) supports climate finance and scalable carbon projects.

This Capstone builds on past work with NSIA, and sets the stage for future collaboration in carbon market development

Market gaps

No centralized platform for carbon credit trading in Nigeria and Africa.

Lack of a structured market leads to inefficiencies, limited access to buyers, and lack of transparency.

Opportunities

Provides a reliable and standardized marketplace for Nigerian & African carbon credits.

Attracts both **local and international participants**, **enhances market liquidity**, and **creates economic opportunities** through sustainable practices.

Captures a portion of the growing global carbon credit market (expected to reach **USD 271.6 billion by 2027**), enhancing their climate finance and FDIs. (Refinitiv, S&P Global).

Carbon Exchange Platform

Unique platform

Act as a point of aggregation for all carbon credits, aligning with NSIA's global climate investment strategy.

Climate goals

Supports Nigeria's **Nationally Determined Contributions (NDCs)** under the Paris Agreement

Leadership

Positions NSIA as a global leader in climate finance and monetizes Nigeria's clean energy transition

Compliance

Contributes to the development of **robust African voluntary and compliance markets carbon market in Nigeria**

A Self Regulatory Organisation (SRO) technology platform for suppliers of carbon offsets to interact with buyers of carbon offsets.

Carbon exchange is a market infrastructure that **connects smaller players** to Article 6 and bridges supply and demand in the carbon offset market.

Allows for evolution to a **mature market** that includes cap and trade (carbon taxes) in the future.

No Market

No unified platform to buy and sell credits to use as offsets

The Solution



Carbon Trading Platform

Connects buyers and sellers of carbon credits in an efficient and verifiable manner




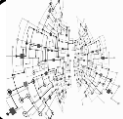

The Problem





01.

Literature Review – Comparative Analysis

	China	Saudi Arabia	Malaysia	Singapore
 Exchange	VCM: China Beijing Green Exchange (CBGEX) ETS: Shanghai Environment and Energy Exchange (SEEE)	Voluntary Carbon Market Exchange Platform (operated by RVCMC)	Bursa Malaysia Bursa Carbon Exchange (BCX)	Climate Impact X (CIX) AirCarbon Exchange (ACX)
 Governance	Government regulated	Public-Private	Stock Exchange (Public-private)	Private entities
 Role of Stock Exchange	Collaboration for price benchmark index	Strategic partner in infrastructure and design; leads in governance and operations	Governance, market oversight, and contract standardization	Establishment; market infrastructure expertise
 Technology Partner	Local technology companies	Xpansiv	Deon Digital	NASDAQ
 Pricing	Market based (2024) <ul style="list-style-type: none"> \$14.62 per ton 	Market-based (2024) <ul style="list-style-type: none"> \$10/credit 	Market-based (2023) <ul style="list-style-type: none"> \$4.2/credit for biogas \$15.4/credit forest-based 	Spot market auctions <ul style="list-style-type: none"> \$5.36 (nature based) \$27.8 (Blue carbon)

	China	Saudi Arabia	Malaysia	Singapore
Registry	Separate registries for both, CBGEX and SEEE - operated by govt bodies	Third-party international registries—Verra and Gold Standard	Third-party international registries—Verra and Gold Standard	Private registries: CIX Clear, American Carbon Registry (ACR)
Verification	Third party auditors (VVBs) approved by Gold and Verra - Local and international	Verra and Gold Standard	Verra and Gold Standard	Verra and Gold Standard
Supply of Credits	ETS: Domestic allowances VCM: Investors like VITOL, Shell, BP	International projects in Asia, Africa, and Latin America	Domestic (Sabah's Kuamut Forest Project) and international (e.g., China, Cambodia)	International projects - bilateral trading facilitated by CIX Clear
Demand for Credits	Domestic - Compliance requirements	Domestic corporations—driven by voluntary offset commitments (e.g., Aramco, Ma'aden, SABIC)	Domestic—ESG and net-zero commitments (e.g., Petronas, Maybank, CIMB)	Domestic - driven by carbon tax
Key Challenge	Data transparency	Liquidity, credit quality, and integrity concerns	Market education, regulatory fragmentation (state vs. federal), and low trading volumes	Liquidity

01	Compliance market	<ul style="list-style-type: none">• Important for generating demand for credits• Allowances can be free or auctioned• Emissions beyond allowances can be purchased through the VCM
02	Verification	<ul style="list-style-type: none">• Preferable to use globally accepted standards like Gold and Verra• CIX's quality assessment team makes final recommendation for project listing
03	Liquidity	<ul style="list-style-type: none">• A VCM requires a compliance market for demand generation• International investors like VITOL, BP and Shell can help create supply
04	Registry	<ul style="list-style-type: none">• A national registry can allow for consolidation and ensuring integrity of the credits
05	Technology partners	<ul style="list-style-type: none">• Most countries outsource technical development to companies like Xpansiv and NASDAQ• Allows smooth and reliable operations of the exchange



SIPA Capstone Team & Renewables Investment Platform For Limitless Energy (RIPLE)

RIPLE collaborates closely with NSIA facilitating sustainable energy investments aligned with global climate goals.



SIPA Capstone Team & Carbon Vista

Doc. SIPA Capstone Team
Abuja, March 2025



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Supply and Demand Market Research

Voluntary-Driven

Domestic Buyers

Quadrant I

- Local ESG-aligned buyers
- Financial institutions, airlines, renewable energy companies
- Eg: Zenith Bank, Air Peace

Focus

International Buyers

Quadrant II

- Global voluntary buyers seeking to offset unavoidable offsets
- Eg: Google, Amazon, Patagonia







Quadrant III

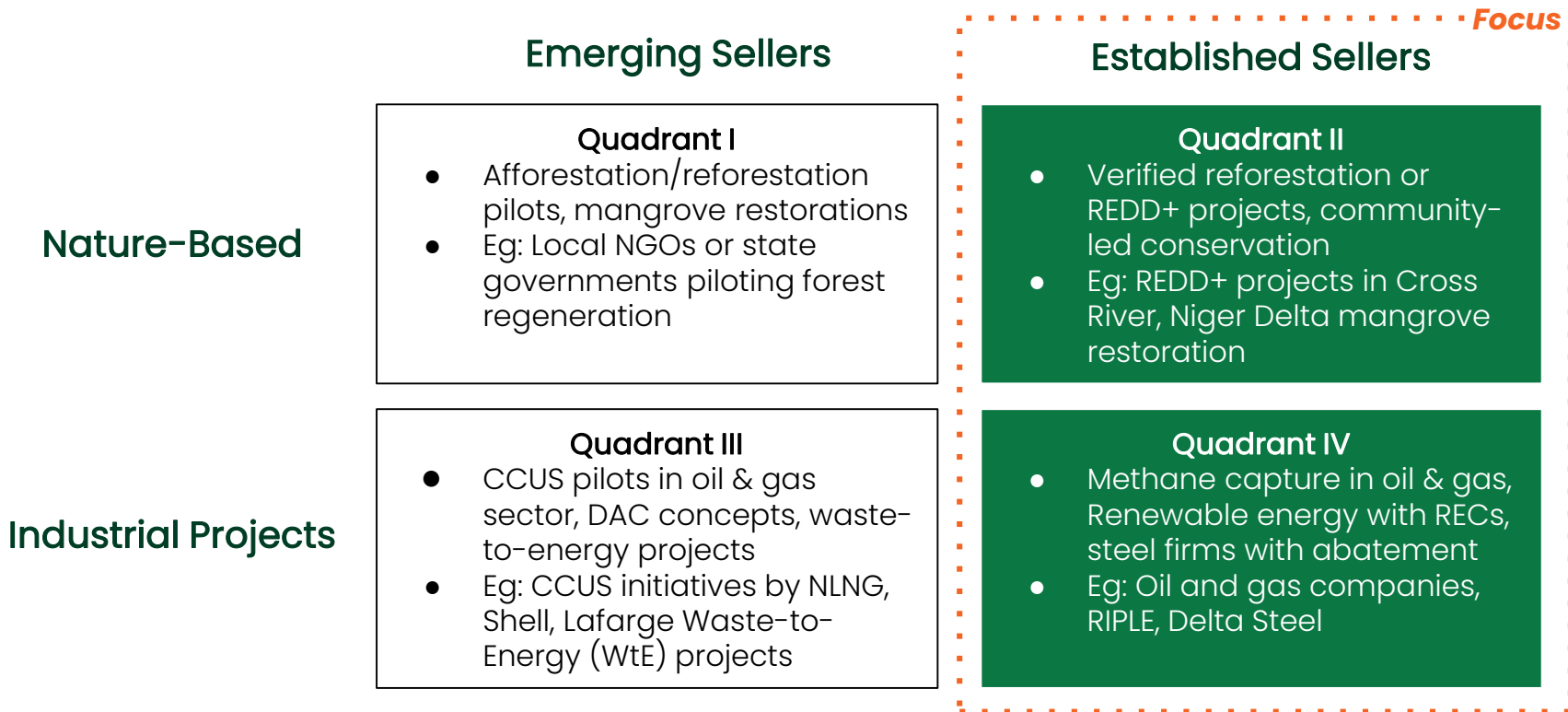
- Companies subject to national regulation
- Large emitters: oil & gas, cement, manufacturing
- Eg: NLNG, Dangote, BUA Cement

Quadrant IV





- Multinationals with global climate reporting obligations
- Subject to schemes like EU ETS, CBAM
- Eg: Shell, Total Energies, EU importers

Compliance-Driven

	Compliance Buyer	Voluntary Buyer	Sovereign Buyer
 Key Interest	Legal compliance , predictable delivery, low reputational risk	Reputational safety, credibility , transparency, co-benefits	Paris Agreement alignment , long-term cooperation
 Quality & Standards	Compliance-eligible standards (e.g. Verra, Gold Standard, EUAs)	High integrity credits (e.g. Verra, Gold Standard, ART TREES)	Article 6.2 compliant , robust accounting, transparency
 Type of Credit	Primarily emission reductions (e.g. reforestation, renewables)	Reductions and removals (e.g. biochar, DAC)	Reductions and removals eligible under NDC's
 Price Willingness	Moderate to high ; \$25-\$80+/t, lower in developing markets	Low to moderate : \$<1-\$19/t (reduction); \$20-\$100+/t (removal)	High : \$100-\$300+/t (mostly for high-quality removal)
 Market Size	\$113 billion in 2024 with 2% increase from previous year	\$1.7 billion in 2024 with declining trend	Increasing numbers of buyers and bilateral agreements
 Examples	EU ETS participants, large oil & gas companies (e.g. Shell)	Large technology companies and airlines (e.g. Google, Delta)	Established governments like Singapore, Japan, Switzerland



*In carbon markets, **supply is driven by demand**.
Sellers must align with buyer expectations on **credit quality, certification, and co-benefits**.*

	Type of Project in Nigeria	Buyer Fit	Credit Type/ Standard	Volume Potential (tCO ₂ e/yr)	Pricing Alignment	Sales Readiness
 <p>Community / Established Nature-Based Seller</p>	REDD+ in Cross River; Mangrove restoration in Niger Delta; Agroforestry in Middle Belt	<ul style="list-style-type: none"> • Sovereign buyers (e.g., Switzerland, Singapore) • ESG-driven voluntary buyers (Unilever, Google) 	Verra, Plan Vivo, Gold Standard (REDD+, NBS)	2 – 5 million	Moderate (\$15–25/t)	High
 <p>Private Sector Seller</p>	Solar + hybrid mini-grids Sustainable agri-carbon e-Mobility (EcoKada)	Voluntary buyers (tech, logistics, consumer goods)	Verra, Gold Standard, RE-focused methods	1 – 2 million	Moderate High (\$20–30/t)	High
 <p>Established Industrial / Infrastructure Sellers</p>	Waste-to-Energy (Lafarge); CCUS pilots (Shell/NLNG)	Compliance buyers (EU importers, Shell, CBAM-aligned firms)	Verra, EU Fuel Quality Directive Article 6.4-ready	5 – 10 million	Moderate (\$15–35/t)	High
 <p>Sovereign / Government Backed Sellers (Institutional Seller)</p>	National registry (NCMI); Article 6.2 readiness programs; Subnational credit aggregation	Sovereign buyers under Article 6.2 (Japan, Switzerland)	Article 6.2 eligible	Pipeline based	Variable (negotiated bilaterally)	Moderate

01	Leverage High-Readiness Supply	<ul style="list-style-type: none">• Prioritize transaction-ready sellers with certified, MRV-backed projects.• Focus on Quadrant II & IV (nature-based & industrial) to build early liquidity.
02	Build Certification & Aggregation Capacity	<ul style="list-style-type: none">• Invest in certification support for emerging projects (PDD and MRV tools).• Enable credit aggregation to help small projects scale to market access.
03	Align Supply with Buyer Demand	<ul style="list-style-type: none">• Match seller types with buyer segments (REDD+ → sovereign buyers, methane → compliance buyers).• Use exchange to facilitate high-integrity matchmaking.
04	High Integrity and Global Platform	<ul style="list-style-type: none">• Adapt go-to-market strategies for different buyer types—compliance & sovereign with tailored pricing.• Prioritize verified, transparent credits aligned with top-tier standards (Verra, Gold Standard, Article 6.2)
05	Activate Domestic Participation	<ul style="list-style-type: none">• Engage domestic corporates and regulated sectors to stimulate baseline demand and market liquidity.• Position Nigeria as a regional carbon hub by enabling bilateral deals and aligning with policy frameworks.



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Enabling the Carbon Exchange Platform



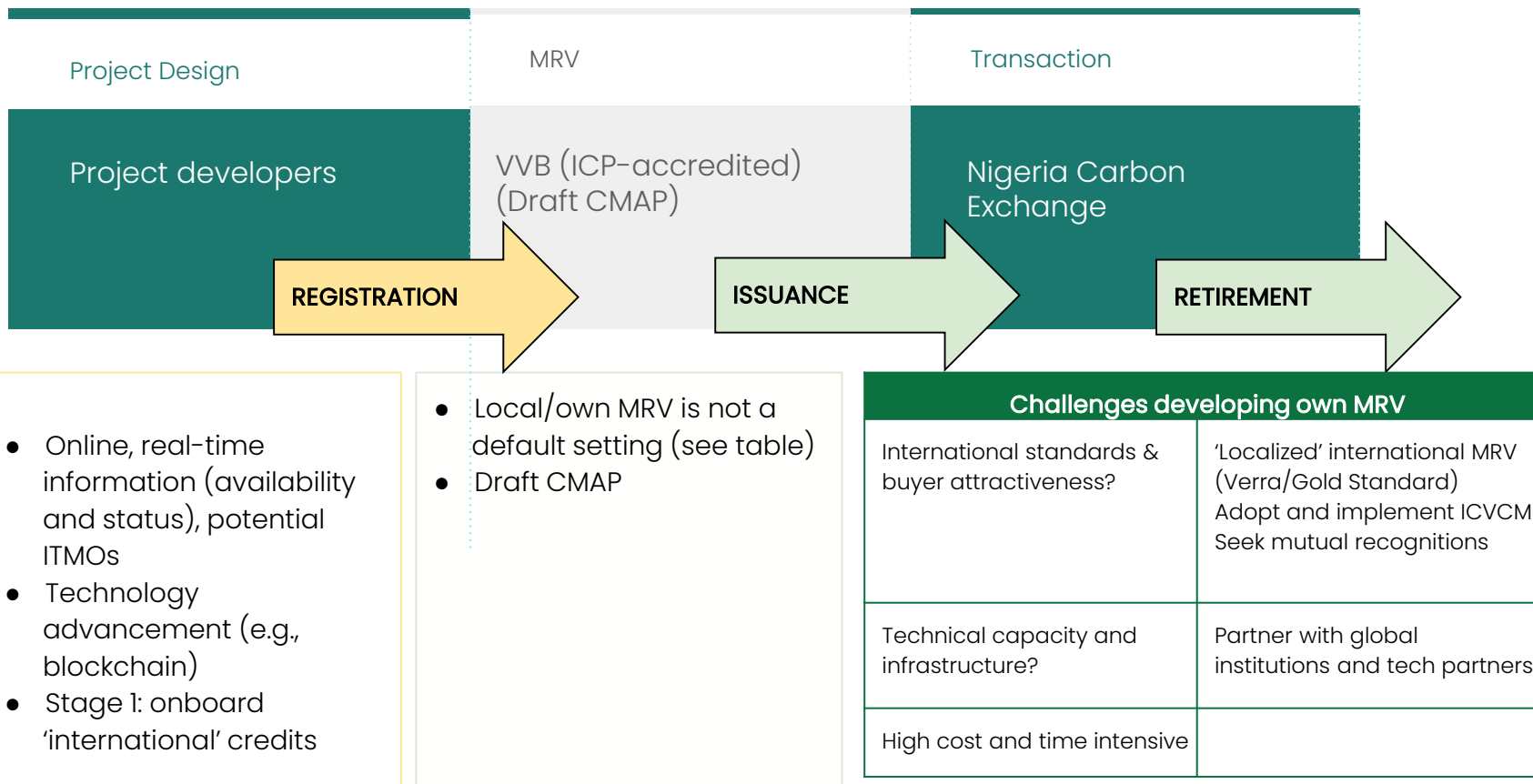
SIPA Capstone Team & The National Council on Climate Change¹⁹

Doc. SIPA Capstone Team
Abuja, March 2025

The National Council on Climate Change (NCCC) is Nigeria's lead agency for coordinating national climate policy and carbon market development. It oversees the implementation of climate strategies, facilitates international cooperation, and ensures alignment with Nigeria's commitments under the Paris Agreement.

Phase 1: Building and Design Carbon Exchange Platform

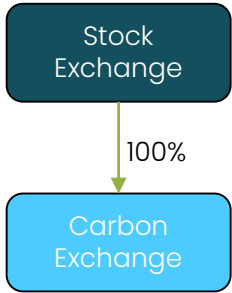
Why an ecosystem matters



Phase 1: Building and Design Carbon Exchange Platform

Malaysia's model is recommended for Nigeria

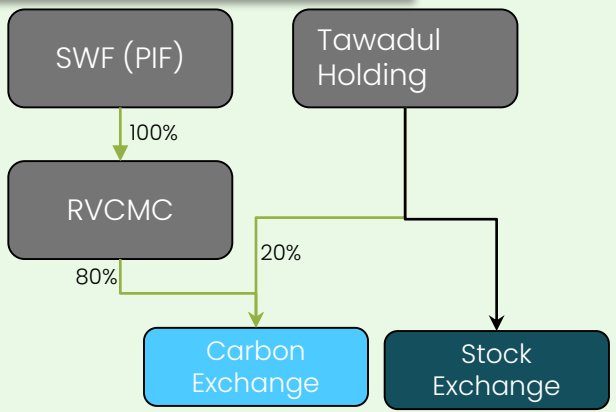
A: Malaysia



Opportunities	Challenges
Leverage existing infrastructure, credibility and market trust	Underlying regulatory is still unclear
Cost efficient (for instance, integration of human capital)	NGX internal compliance and capital market regulations
	Perception: profit over environmental integrity
	Expand with Nasdaq or new technology partner

Recommendation: Malaysia model

B: Saudi Arabia



Opportunities	Challenges
Capital strength and financial expertise by SWF	Starting from scratch
Flexibility to design market structure	Potentially longer decision making process
	Regulatory gaps/overlaps; internal compliance
	New technology partner

Phase 2: Global Market Access Depends on Credibility

Buyers want credits they can trust

Credibility drives market access

- Multinational buyers (e.g., Microsoft, Shell, Stripe) screen heavily for credit integrity
- Most will only buy credits tagged by globally recognized standards (**Verra, Gold Standard, ICVCM-CCP approved**)
- Using these standards **signals alignment with environmental and social safeguards; permanence, additionality**
- Without this, credits from a **local registry risk being seen as “junk carbon”** or “uncertain compliance-grade.”

Integration over reinvention

NSIA can still retain sovereignty while building credibility.

- NSIA could act as a **coordinating platform** or host a front-end registry interface that plugs into Verra or GS.
- This maintains local visibility and ownership **without compromising market trust**.

A dual-track approach can work

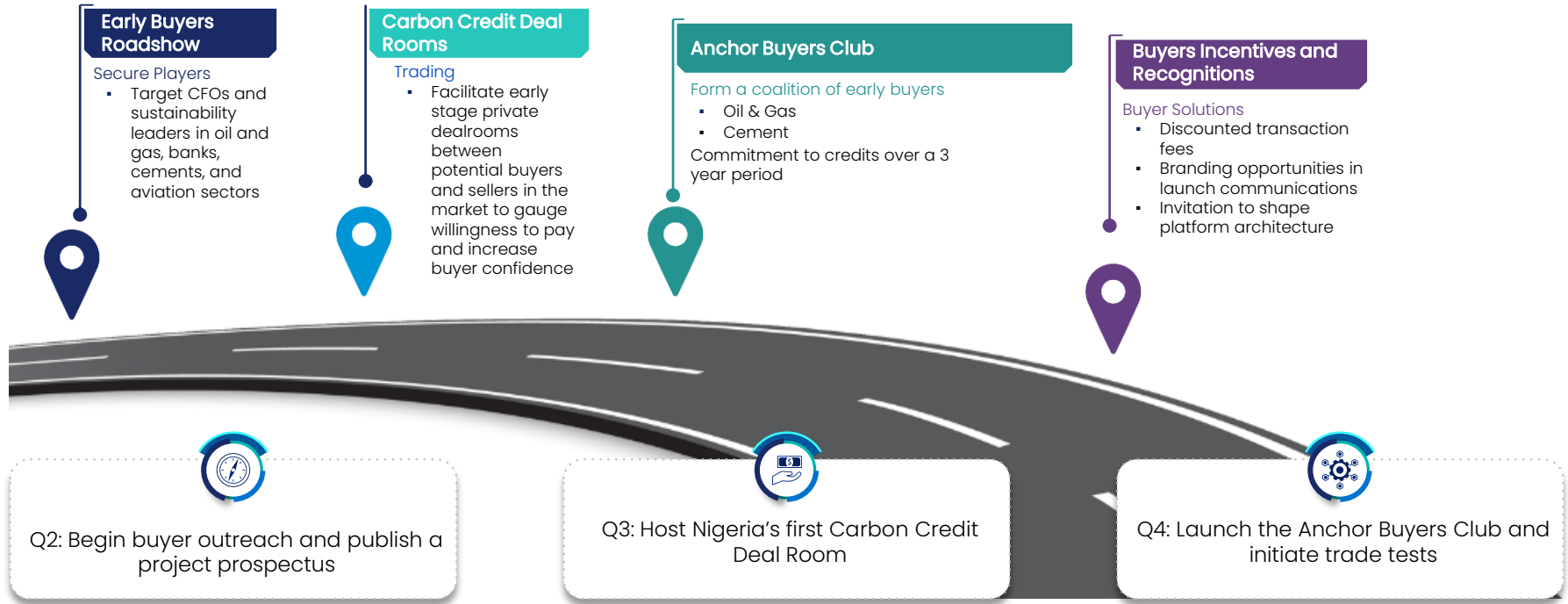
Many countries (e.g., Indonesia, Kenya) are using global standards now, while developing local registry with an eye on future compliance markets.

- **NSIA can build capacity**, test MRV pipelines, and pilot local methodologies in parallel — but should lead with globally trusted credits **to unlock immediate capital flows**.

Phase 2: Activating the Market

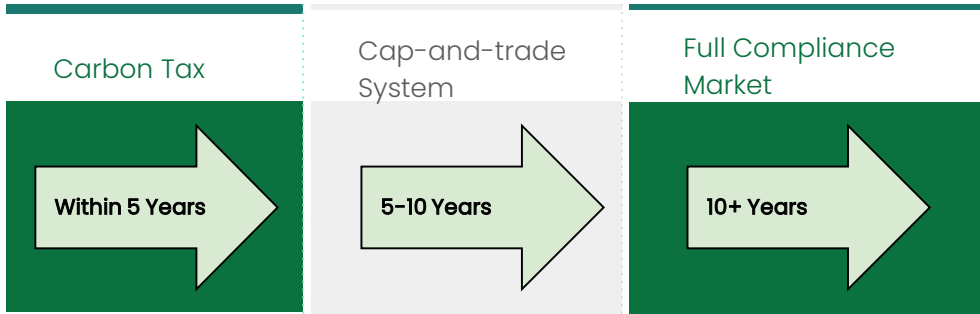
How a national market activation roadshow will kickstart the process

A credible carbon exchange must be matched by robust and early demand



Phase 3: Integrating Compliance Tools and Scaling the Exchange

Compliance Market – Carbon Tax and ETS



Carbon Tax Model – Comparative Analysis

Country	Model Description	Offset Use	Relevance to Nigeria
South Africa	Hybrid carbon tax with allowances and offset credits	Yes – 5% or 10% offsets for certain combustion activities and process emissions and fugitive emissions	Provides a template for offset inclusion, rebate schemes, and managing exemptions