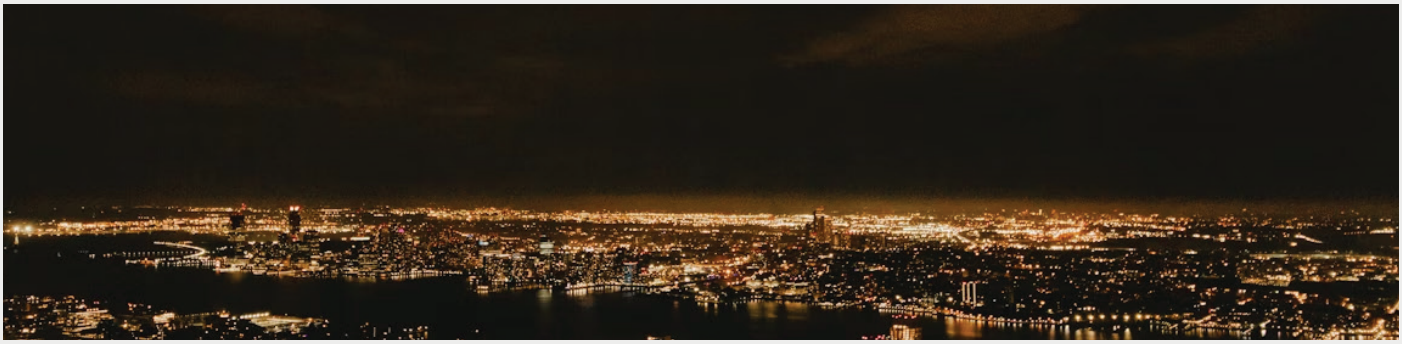
CIRUU ENERGY

Europe-Africa Energy Security and The Carbon Border Adjustment Mechanism (CBAM)

Energy Market Commentary

April 2026

Executive Summary



The European Union's (EU) energy-security strategy is no longer only about replacing Russian gas or accelerating renewables. It is now about synchronising five systems at once: affordable power, industrial competitiveness, clean-trade compliance, critical-minerals resilience, and investable cross-border partnerships. The Carbon Border Adjustment Mechanism (CBAM) disciplines the carbon content of traded goods. The Critical Raw Materials Act (CRMA) disciplines the material dependencies embedded in clean-energy and strategic technologies. Together, they force companies to rethink sourcing, contracting, financing, technology choice, plant design, and portfolio risk management. For Europe, the near-term implication is operational. CBAM has entered its definitive regime. This means importer readiness can no longer be treated as a sustainability reporting exercise. It is now a customs, tax, finance, procurement, and board-risk issue. Firms need verified embedded-emissions data, authorised declarant status where applicable, fit-for-purpose internal controls, supplier engagement, certificate-cost forecasting, and escalation protocols for non-compliant shipments. Companies that still rely on default values or fragmented spreadsheets face avoidable cost, customs delay, and reputational exposure.

For Africa, the implication is more strategic. The continent faces a two-sided risk. On one side, CBAM can weaken the competitiveness of carbon-intensive exports to Europe where industrial power systems remain emissions-heavy, or verification capability is underdeveloped. On the other, CRMA and Europe's clean-industrial policy create a window for African producers and governments to move up the value chain - provided they can supply cleaner electricity, improve permitting and logistics, strengthen emissions MRV systems, and negotiate partnerships that support local beneficiation rather than simple extraction. Critical-minerals concentration remains a structural vulnerability. The International Energy Agency (IEA) reported in 2025 that refining concentration remained stubbornly high and diversification was progressing only slowly, while China continued to dominate refining across most strategic minerals. This means that energy-security planning cannot stop at resource endowment; it must address processing, recycling, stockpiling, traceability, and geopolitical scenario planning. The EU's CRMA targets are directionally right, but the challenge is execution speed, financing depth, community consent, and the ability to build commercially viable assets before demand tightens further.

The strategic implication for CIRUU Energy clients is clear: winning organisations will integrate policy, engineering, investment, and commercial disciplines into one operating model. CIRUU's role includes ensuring that integration layer - turning fragmented regulation and market signals into board-level decisions, bankable investment cases, supplier-readiness programmes, and investor-grade monitoring. The opportunity is strongest where Europe and Africa intersect: green power for industry, low-carbon export corridors, mineral-to-processing value chains, infrastructure due diligence, policy translation, and early-warning monitoring of trade, finance, and supply-chain risk.

1. Strategic Market Context

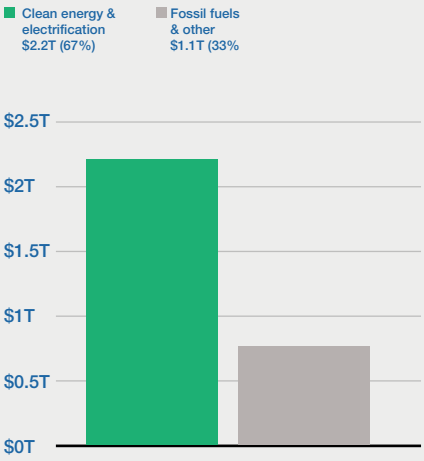
Energy buyers now operate in a market where policy and market risk are inseparable. The IEA estimated that total energy investment would reach USD 3.3 trillion in 2025, with around USD 2.2 trillion flowing to clean-energy and electrification-related categories. Investment in the electricity sector alone was set to reach USD 1.5 trillion in 2025, underscoring the centrality of power systems to competitiveness and resilience. Yet high power prices, slow permitting, interconnection queues, and grid congestion remain binding constraints in many jurisdictions.

The European Commission's Clean Industrial Deal and Affordable Energy Action Plan sharpened the policy emphasis on competitiveness, energy affordability, industrial decarbonisation, and resilience. That matters because European Union's (EU) industrial challenge is no longer merely to decarbonise; it is to decarbonise fast enough to remain investable while controlling power costs and preserving strategic manufacturing capacity. At the same time, the geography of capital remains uneven. The International Energy Agency (IEA) reported that, outside China, Emerging Market and Developing Economies (EMDEs) attracted only 27% of total energy investment and only 18% of clean-energy spending in 2025. This imbalance is directly relevant to Africa-linked mandates. It implies that many high-potential projects will continue to fail not because the resource case is weak, but because financing structures, policy stability, execution capability, and offtake credibility are not yet strong enough to absorb capital at scale.

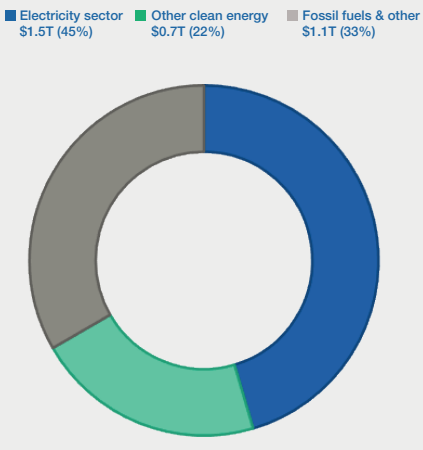
STRATEGIC IMPERATIVE

The EU's energy strategy now requires synchronising five systems: affordable power, industrial competitiveness, clean-trade compliance (CBAM), critical-minerals resilience (CRMA), and investable cross-border partnerships. Africa is central to all five. The next competitive gap will not be created by better technology alone it will be created by better integration of policy, supply chains, financing, and operating reality.

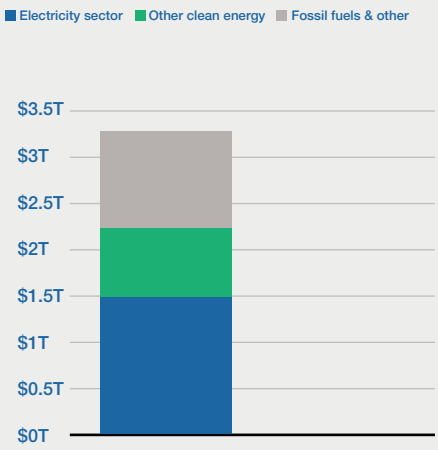
Total investment breakdown
USD trillion (2025)



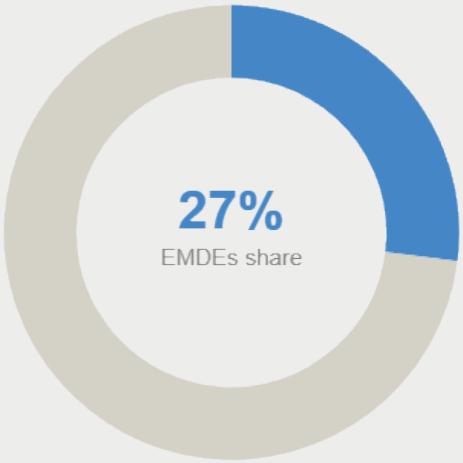
Electricity sector in context
share of total investment



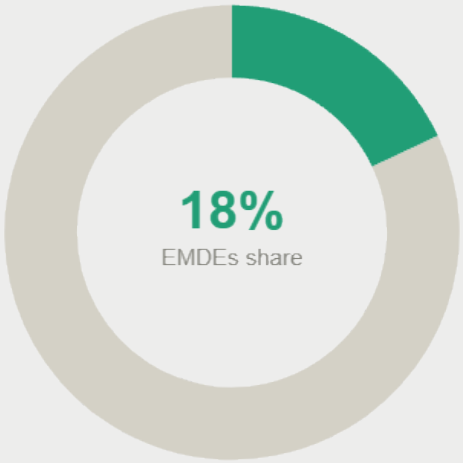
Investment composition
stacked view (USD trillion)



Total energy investment
Share of global total, excl. China (2025)



Clean energy spending
Share of global total, excl. China (2025)



Headline Metrics

$3.3T Global Energy Investment 2025	**$2.2T** Clean Energy Investment	**2%** Africa's Clean Energy Share	**85%** Africa Debt Service vs Energy Investment
Jan 2026 CBAM Definitive Launch	**12,000+** Operator Applications	**70%** China Avg Refining Share	**9 Mt** Africa H2 Potential by 2035

The Five-System Challenge

European energy security depends on simultaneously managing five interdependent systems. Failure in one creates cascading vulnerabilities across the entire portfolio.

1

Affordable Power

Renewable intermittency requires massive grid investment, storage, and cross-border interconnection. European industrial competitiveness is directly tied to power cost.

2

Industrial Competitiveness:

Steel, chemicals, cement, and aluminium face dual pressure from decarbonisation costs and competition from less-regulated jurisdictions. CBAM creates a level playing field but demands compliance infrastructure.

3

Clean-Trade Compliance (CBAM):

Exporting to the EU now requires accurate emissions measurement, third-party verification, certificate acquisition, and quarterly reporting, creating substantial compliance friction for developing-country suppliers.

4

Critical-Minerals Resilience (CRMA):

Clean energy depends entirely on critical minerals where China controls 70% of global refining. The EU's CRMA sets aggressive 2030 benchmarks that remain far from achievement.

5

Investable Cross-Border Partnerships:

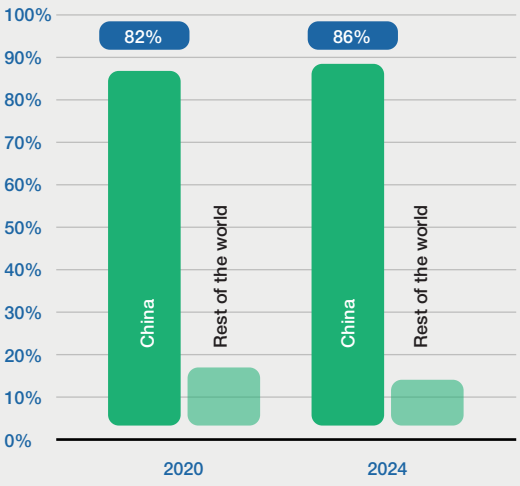
Neither CBAM compliance nor minerals diversification can succeed without stable, bankable partnerships with African suppliers requiring aligned incentives, governance, and risk mitigation.

Findings Across All Domains

- CBAM is not merely a carbon tax, it is a governance architecture linking customs, emissions accounting, verification, carbon pricing, and trade competitiveness into a single regulatory sy stem.
- Supply concentration is accelerating, not declining: China's refining share across 19 critical minerals rose from 82% to 86% (2020–2024), contradicting diversification intent.
- Africa holds 30% of global mineral reserves and 60% of solar potential, yet receives only 2% of global clean energy investment, a structural misallocation that undermines both energy access and EU supply security.
- Conditionality in partnerships is shifting: African partners increasingly demand infrastructure investment, local processing, and technology transfer, not just offtake agreements.
- The EU's Clean Industrial Deal (February 2025) and Affordable Energy Action Plan create a EUR 100B+ policy framework that will reshape industrial investment across both continents.

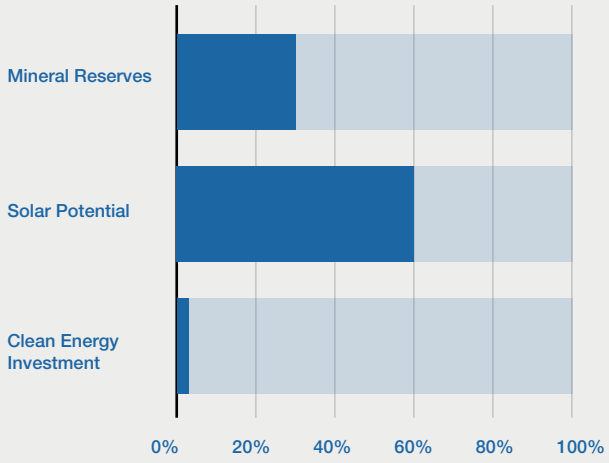
China's mineral refining concentration

Share of global refining across 19 critical minerals



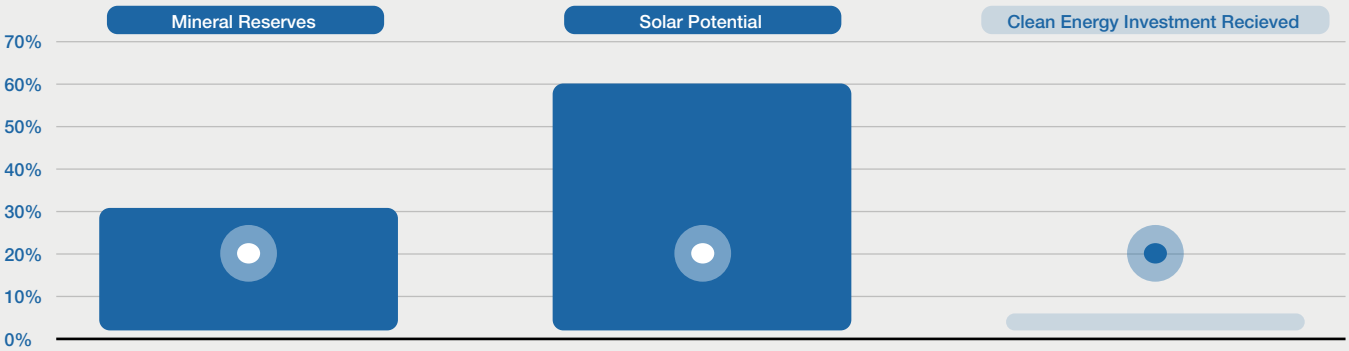
Africa's resource endowment vs investment

Potential vs actual (% of global share)



The Africa paradox: endowment vs investment gap

Resource potential (%) against clean energy investment received (%)



2. CBAM Definitive Regime: Regulatory Architecture and Compliance

STRUCTURAL INSIGHT

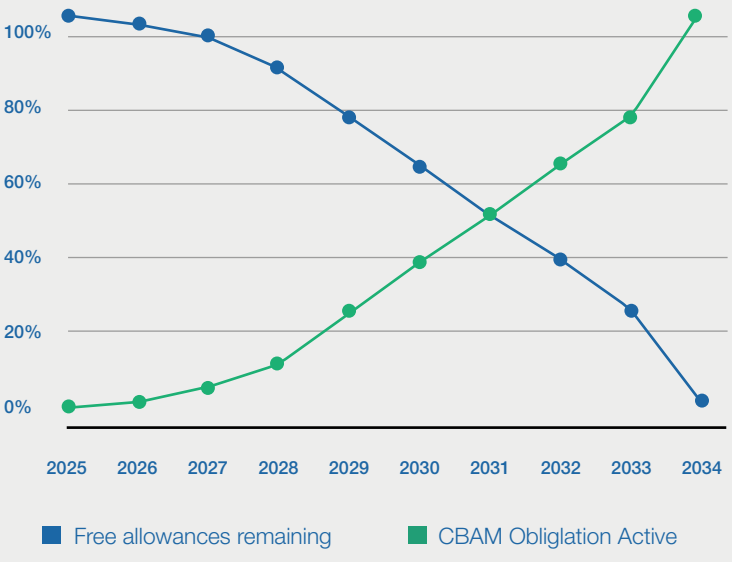
CBAM is not merely a carbon tax, it is a governance architecture linking customs classification, emissions accounting, third-party verification, carbon pricing, and trade competitiveness into a unified regulatory system. Compliance requires new infrastructure investments, procedural changes, and supplier onboarding at an unprecedented scale.

How CBAM Works: Four Components

1. Customs Framework: Products classified under EU Combined Nomenclature covering steel (CN 7207–7326), aluminium, cement, fertilizers, electricity, and hydrogen. 180 downstream products proposed for scope expansion.
2. Emissions Accounting & Verification: Every covered import must have measured or calculated emissions data (Scope 1 and Scope 2). Verification by ISO 14064–certified third parties. Default values penalise non-reporters.
3. Carbon Pricing Mechanism: Certificate price linked to weekly average EU Emissions Trading System (ETS) allowance price. Quarterly holding requirement reduced from 80% to 50% under the 2025 Simplification Package. First certificate sales begin February 2027.
4. Trade Competitiveness Framework: EU producers receive free ETS allowances proportional to emissions, phasing out gradually from 2026 to 2034. Third countries with equivalent carbon pricing may qualify for preferential treatment.

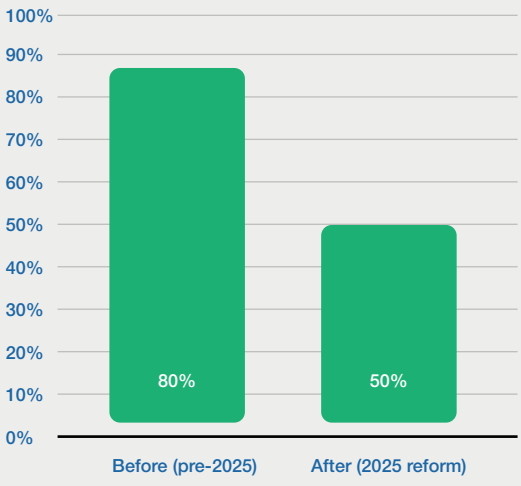
Free ETS allowance phase-out (2026–2034)

% of free allowances remaining for EU producers under CBAM



Certificate holding reform

Quarterly requirement before vs after 2025 Simplification Package



Key Timeline

Date	Milestone	Implication
Jan 2026	Definitive regime activation	12,000+ operators begin reporting; 4,100+ authorized declarants
Feb 2027	Certificate sales begin	CBAM certificates trade on EU platform; price linked to ETS
Sep 2027	First certificate surrender	Importers surrender certificates for 2026 embedded emissions
2028–2029	Free allowances at 50%	Mid-point parity between free ETS allowances and CBAM exposure
2030–2032	Free allowances at 20–30%	Significant cost escalation for covered sectors
2034	Full CBAM exposure (100%)	Complete phase-out of free ETS allowances; full carbon border price

Impact on Third-Country Exporters

For African exporters, CBAM creates compliance obligations that exceed existing environmental or carbon accounting standards in most developing jurisdictions. Key requirements include installing ISO 14064–standard metering systems, engaging EU-approved verifiers, establishing quarterly data governance processes, and absorbing initial cost pressure of 5–15% margin reduction on commodity exports. The most critical bottleneck is MRV (Monitoring, Reporting, and Verification) infrastructure, most African steel mills, cement plants, and fertilizer producers lack the metering capability to disaggregate process-level emissions from facility-level energy consumption.

Challenges in Implementing MRV Standards

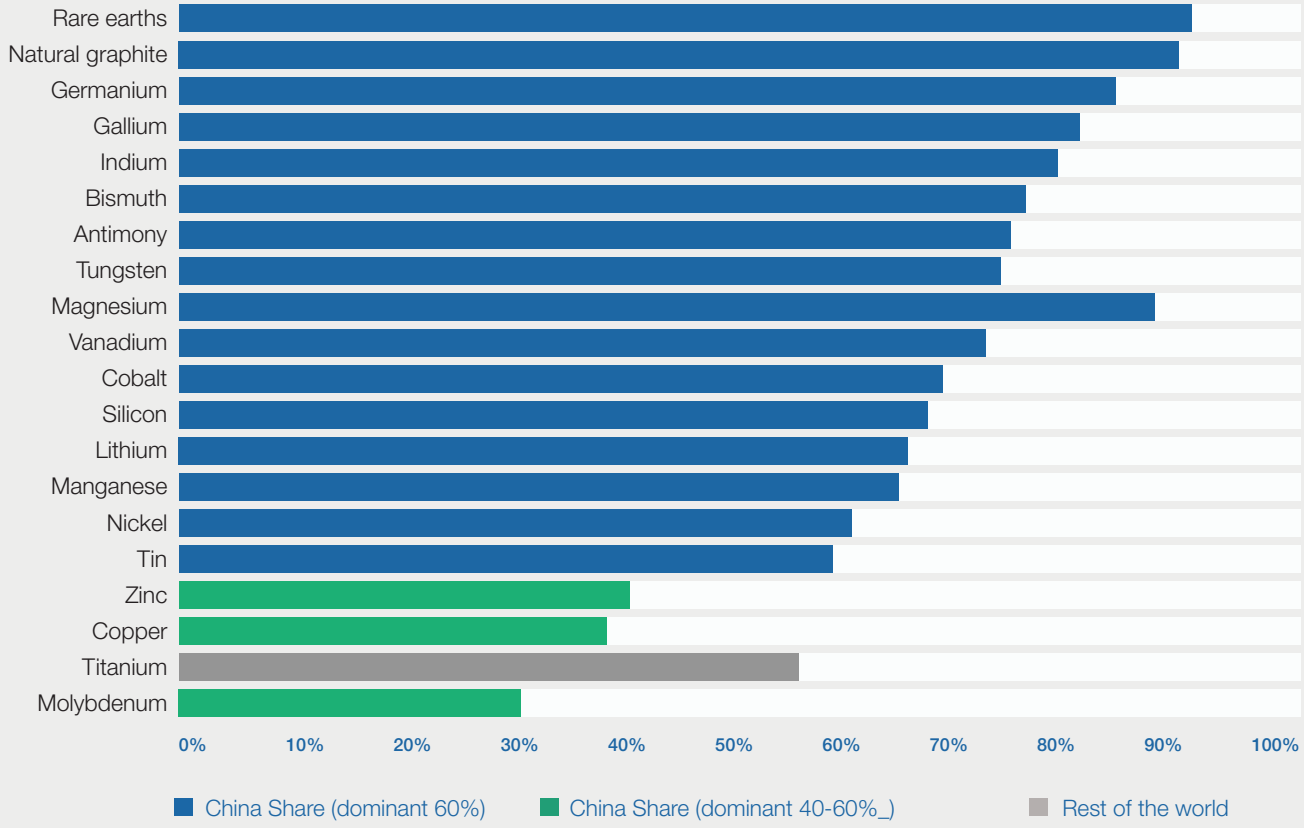
3. Critical Minerals: Concentration Risk and CRMA Implementation

SUPPLY CHAIN IMPERATIVE

Supply chain diversification is the cornerstone of energy security, yet critical minerals are moving in the opposite direction. China dominates refining for 19 of 20 minerals analysed, with approximately 70% average market share. The challenge is not mining concentration but refining concentration

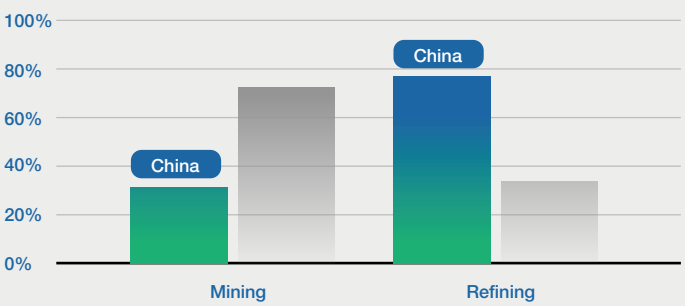
China's refining share across 20 critical minerals

Estimated % of global refining capacity controlled by China per mineral



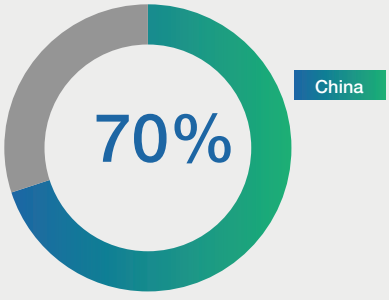
Mining vs refining concentration

China's share at each stage of the value chain (illustrative avg.)



Refining dominance: China vs the world

Average share of global critical mineral refining capacity



Mineral-by-Mineral Risk Assessment

Mineral	Top Refiner	Share	Risk Level	Diversification Status
Graphite	China	90%	CRITICAL	No alternative refining at scale
Rare Earths	China	75%	CRITICAL	Myanmar, Vietnam mining; no refining alternatives
Cobalt	China	65%	HIGH	DRC mining; Zambia emerging refining
Lithium	China	65%	HIGH	Chile, Australia mining; EU refining planned
Nickel	Indonesia	45%	ELEVATED	Philippines, Canada alternatives exist
Manganese	China	55%	HIGH	South Africa mining; refining gap
Copper	China	40%	MODERATE	Chile, Japan, India refining alternatives

CRMA 2030 Benchmarks

Target	2030 Level	Current Status	Achievement Risk
Extraction (within EU)	10%	3% for most minerals	High—requires 11+ new mines
Processing (within EU)	40%	8–12% across key minerals	Very High—requires 8–12 new refineries
Recycling (within EU)	25%	12–15% for battery metals	Moderate—EUR 2B investment committed
Max single-country dependence	≤65%	Exceeded for 14 of 20 minerals	Very High—structural challenge

Africa's Mineral Endowment

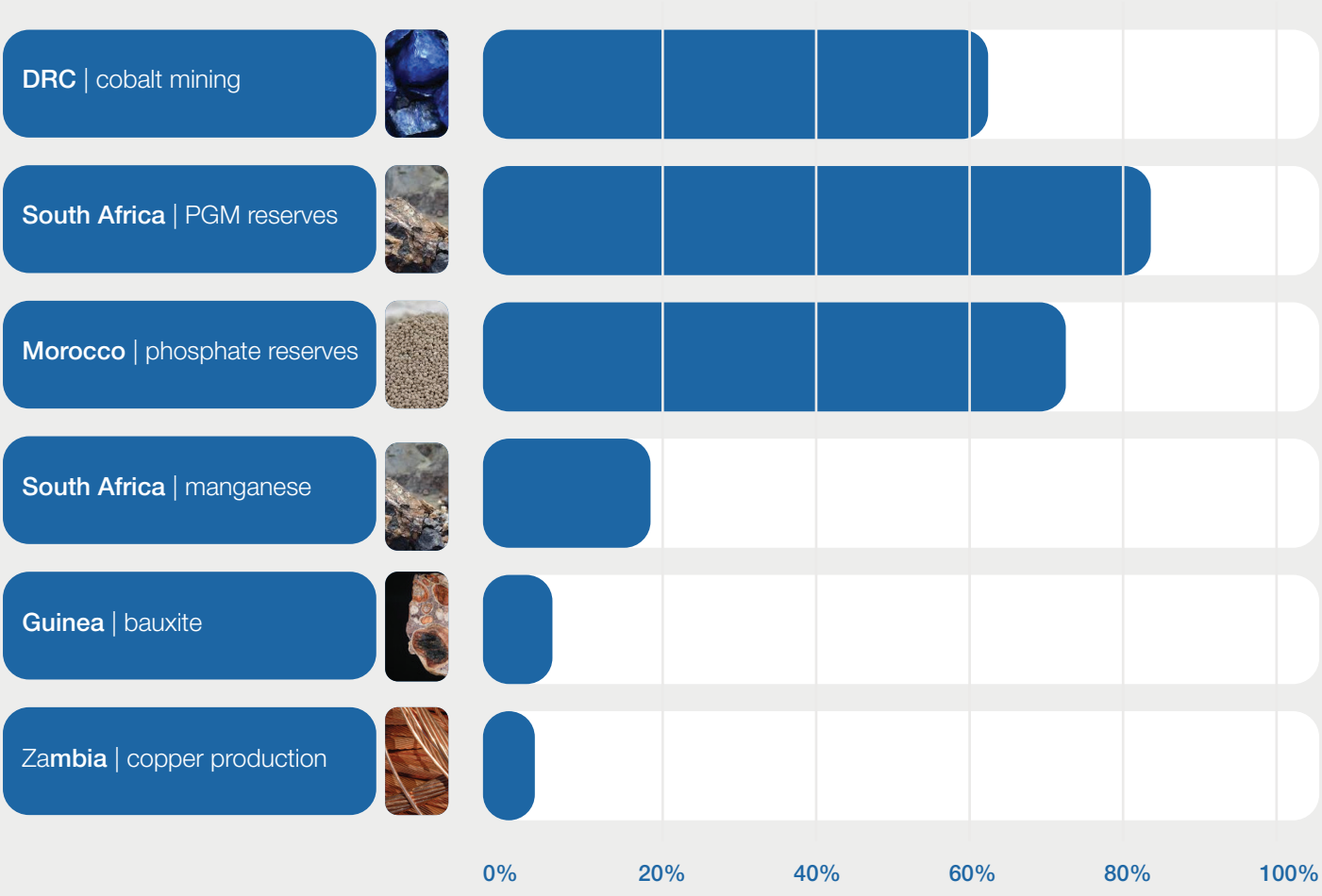
Africa holds approximately 30% of global mineral reserves and produces 40% of global mining output. However, African beneficiation represents less than 10% of global refining capacity. Key positions include: DRC (60%+ global cobalt mining), South Africa (80% PGM reserves, 20% manganese), Zambia (7th-largest copper producer), Morocco (largest phosphate reserves), and Guinea (8% global bauxite). The fundamental challenge is value addition, most African minerals are exported as raw ore, with refining and processing dominated by China. CRMA Round 2 received 40 applications from African countries, signalling growing alignment between EU diversification and African beneficiation ambitions.

30%
of global mineral reserves held by Africa

40%
of global mining output done in Africa

Key African country positions by mineral

Global share (%) held by each country for their primary critical mineral



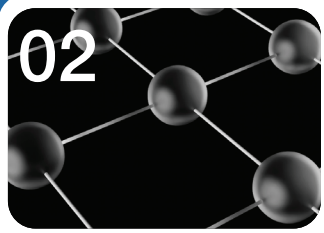
4. Europe-Africa Energy Security: The Four-Lens Framework

STRATEGIC FRAMEWORK

Europe-Africa energy security must be understood through four lenses: secure electrons (power), secure molecules (hydrogen/gas), secure materials (minerals), and secure market access (trade/CBAM). The traditional oil-and-gas framing is no longer sufficient.

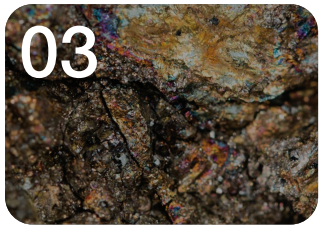
Secure Electrons

Power



Secure Molecules

Hydrogen/Gas



Secure Materials

Minerals

Secure Market Access

Trade/CBAM

Where Interests Align

Domain	European Interest	African Interest	Partnership Model
Renewable Power	Baseload imports via interconnects	Universal access, grid stability	Joint infrastructure, dual-use capacity
Green Hydrogen	Decarbonised industrial feedstock	Industrialisation, export revenue	Offtake with local processing conditions
Critical Minerals	Supply diversification from China	Beneficiation, fiscal revenue	JVs with processing commitments
CBAM Readiness	Compliant supply chain	Market access preservation	Technical assistance, MRV co-investment
Infrastructure	Interconnection, port access	Industrialisation backbone	Blended finance, DFI co-investment

Where Interests Diverge

- Export vs. Domestic Access: Europe wants African power, hydrogen, and minerals exported to EU markets. African nations need these resources for domestic electrification and industrialisation. A North African solar farm exporting to Europe generates revenue but does not close the 600-million-person energy access gap.
- Enclave Extraction vs. Beneficiation: Europe's diversification incentive favours developing African mining capacity to replace Chinese supply in EU refining. Africa's interest is capturing value through local processing, not merely exporting raw ore.
- Compliance Costs vs. Development Capacity: CBAM compliance requires EUR 50–200M per African country to build MRV infrastructure. Without EU co-financing, compliance costs become de facto trade barriers.
- Technology Transfer vs. IP Protection: African nations seek technology transfer for hydrogen production, battery manufacturing, and minerals refining. European firms resist open transfer to protect proprietary advantage.
- Environmental Standards: EU standards increase production costs; African suppliers initially compete on cost, creating a race-to-bottom risk that undermines long-term sustainability.

Key Bilateral Partnerships

EU-South Africa (EUR 11.5B): Coal transition, green hydrogen, just transition, and PGM beneficiation. EU-Namibia: First industrial-scale green iron facility (April 2025), solar/battery/electrolyser integration. EU-DRC/Rwanda/Zambia: Minerals MOUs covering sustainable mining, traceability, and processing co-development. Clean Trade and Investment Partnerships (CTIPs): New EU framework replacing export-only models with reciprocal industrial commitments.

EU-Africa Clean Energy & Trade Partnerships

Partnerships for Green Development:

EU & Namibia, South Africa, DRC, Rwanda, Zambia.

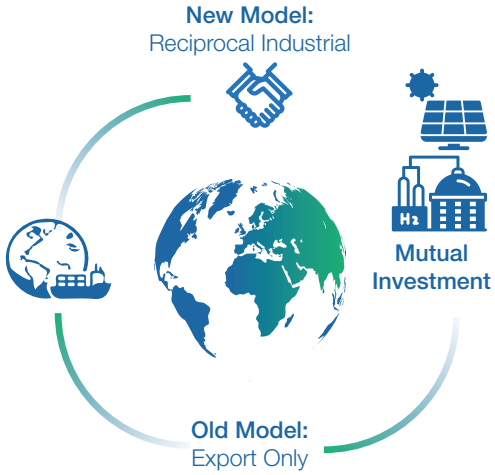
Partnerships for Green Development:

Green Iron

Green Hydrogen

Sustainable Mining

CTIPS Framework: New Co-Development

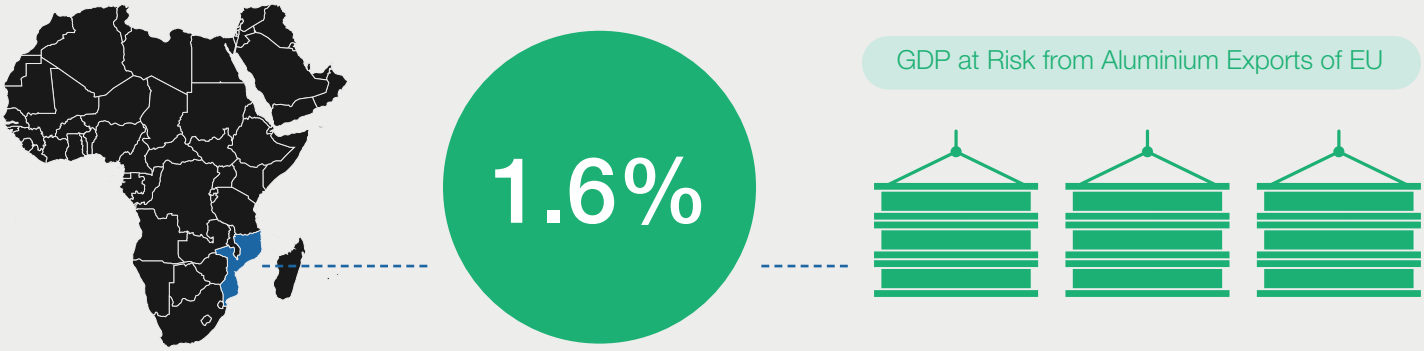


From export dependence to shared development

5. Africa CBAM Exposure and Readiness

EXPOSURE ALERT

African economies with high steel, aluminium, cement, or fertilizer export dependence on EU markets face asymmetric CBAM exposure. Mozambique's aluminium exports alone represent 1.6% of GDP at risk. Without targeted investment in MRV infrastructure, CBAM compliance costs become de facto trade barriers for Africa's most vulnerable exporters.



Country Exposure Assessment

Country	Key CBAM Sector	EU Export Share	GDP at Risk	Readiness
Mozambique	Aluminium smelting	35%+ to EU	1.6%	LOW — No MRV infrastructure
South Africa	Steel, aluminium, ferro-alloys	25% to EU	0.8%	MODERATE — Some MRV capacity
Egypt	Fertilizers, steel, cement	20% to EU	0.5%	MODERATE — Building verification
Morocco	Phosphate fertilizers	60%+ to EU	0.4%	MODERATE-HIGH — OCP leadership
Nigeria	Cement, steel (emerging)	10% to EU	0.2%	LOW — Grid instability limits MRV
Algeria	Fertilizers, hydrogen	40% to EU	0.3%	LOW-MODERATE — Gas infrastructure

Readiness Gaps

Metering Infrastructure

Most African facilities lack disaggregated, process-level emissions metering. Facility-level energy data exists but is insufficient for CBAM product-level reporting.

Verification Ecosystem

Fewer than 50 ISO 14064–accredited verifiers operate in sub-Saharan Africa; the majority are European or North American firms with limited in-country presence.

Data Governance

Quarterly emissions data transmission to EU importers requires digital infrastructure and standardised reporting templates that most African producers have not implemented.

Cost Absorption

CBAM costs are initially borne by exporters as margin compression (5–15%), reducing competitiveness precisely when alternative markets (China, India) do not impose equivalent requirements.

AfCFTA Coordination

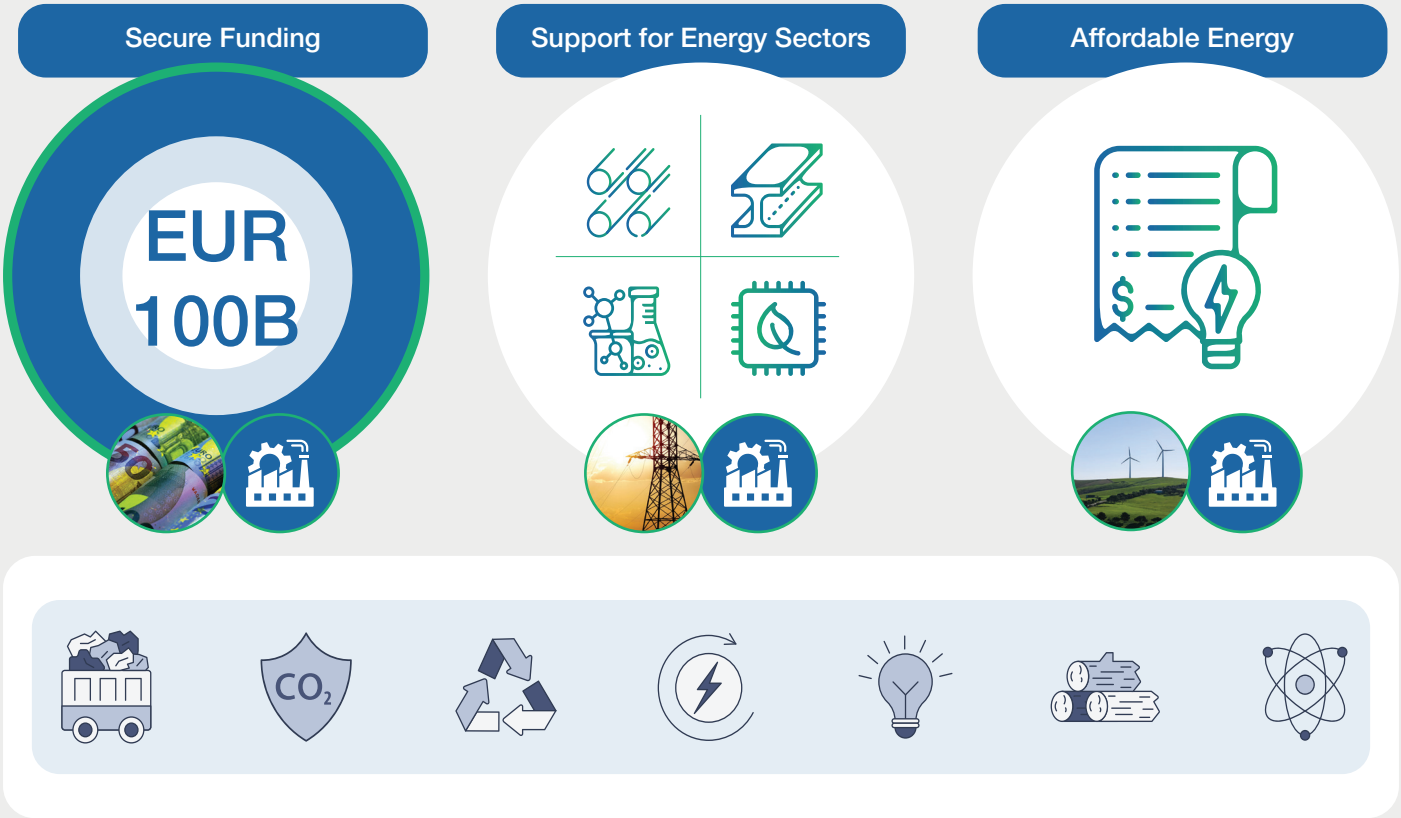
The African Continental Free Trade Area could enable harmonised compliance frameworks across countries, but implementation remains slow and fragmented.

6. EU Industrial Competitiveness and the Clean Industrial Deal

COMPETITIVENESS PARADOX
Europe's energy-intensive industries face a twin bind: decarbonisation raises costs while global competitors undercut on both carbon and energy price. The Clean Industrial Deal (February 2025) attempts to resolve this by making decarbonisation a growth driver—but execution risk is high and timelines are compressed.

Clean Industrial Deal Architecture
Launched in February 2025, the Clean Industrial Deal outlines concrete actions to turn decarbonisation into a growth driver for European industries. Key elements include: an industrial decarbonisation bank targeting EUR 100B in funding (from the Innovation Fund, ETS revenues, and InvestEU revision); focused support for energy-intensive sectors (steel, metals, chemicals, clean-tech); and the simultaneous Affordable Energy Action Plan to reduce energy bills across industries, businesses, and households while accelerating structural reforms.

Key elements of the Clean Industrial Deal Architecture



Emissions Trading System (ETS) Price Trajectory and Industrial Impact

Period	ETS Price Range (EUR/t)	Free Allowances	Net Industrial Impact
2026–2027	75–95	80%	Manageable; transition costs absorbed
2028–2029	85–115	50%	Significant; drives investment decisions
2030–2032	100–140	20–30%	Transformational; high-carbon assets stranded
2033–2034	110–160	0–10%	Full exposure; competitiveness fully CBAM-dependent

Sector Vulnerability

Steel faces the highest combined CBAM and ETS pressure, with carbon costs representing 15–25% of production value by 2030. Cement is similarly exposed, with clinker production generating 0.6–0.8 tCO2 per tonne. Chemicals are complex, with diverse product portfolios creating uneven exposure. Aluminium is energy-cost-driven, making power price the decisive competitive factor. Hydrogen producers benefit from CBAM's inclusion of hydrogen as a covered good, creating market protection for EU green hydrogen against grey imports.

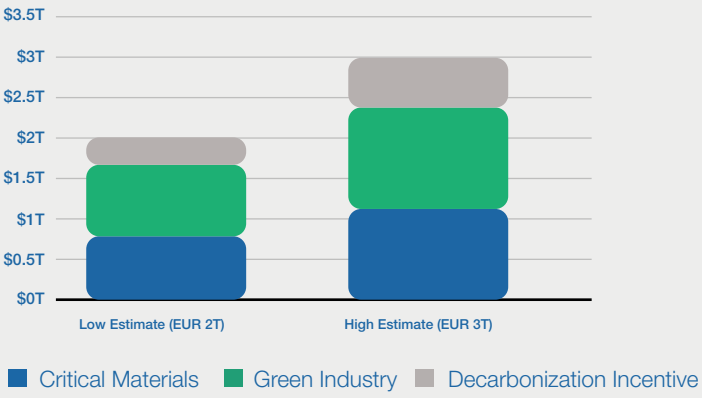
7. Investment and Capital Allocation Framework

INVESTMENT THESIS

The convergence of CBAM, CRMA, and the Clean Industrial Deal creates a EUR 2–3 trillion investment opportunity across the Europe-Africa energy value chain through 2035. However, Africa receives only 2% of global clean energy investment despite holding 30% of mineral reserves and 60% of solar potential. Closing this gap requires new blended finance structures and risk mitigation instruments.

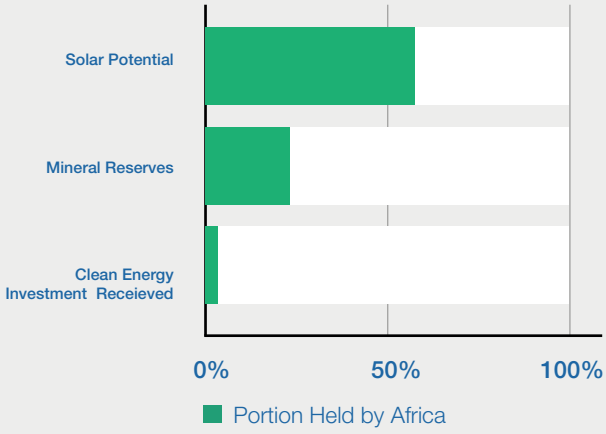
EUR 2–3 trillion investment opportunity breakdown

Estimated allocation across three converging policy pillars, Europe–Africa value chain to 2035 (EUR trillion)



Africa's endowment vs investment: the structural gap

What Africa holds vs what it receives — % of global share



Investment Opportunity Sizing

	Domain	Investment Need (2026–2035)	Current Flow	Gap
	**African renewables & grid**	EUR 200–300B	EUR 30–40B/yr	5–7x shortfall
	**Green hydrogen (Africa)**	EUR 80–120B	EUR 5–10B committed	Major pipeline risk
	**Critical minerals processing**	EUR 40–60B	EUR 15B (CRMA Rd 1)	Execution gap
	**CBAM compliance infrastructure**	EUR 5–15B	<EUR 1B	Near-total gap
	**EU industrial decarbonisation**	EUR 500–800B	EUR 100B (CID target)	Scale-up needed

Blended Finance Instruments

- Concessional Debt: DFI first-loss tranches de-risk commercial lending for African energy projects. Target: reduce cost of capital from 12–18% to 6–9%.
- Carbon Credit Integration: CBAM-linked carbon credits can provide additional revenue streams for verified low-carbon production in Africa.
- Political Risk Insurance: MIGA and bilateral agencies provide investment guarantees against expropriation, currency inconvertibility, and political violence.
- Green Bonds: Sovereign and corporate green bonds for CBAM-compliant infrastructure. Morocco and South Africa have established frameworks; others are emerging.
- Equity Co-Investment: EU Strategic Projects pipeline offers co-investment opportunities for institutional investors seeking CRMA-aligned exposure.

8. Sector Impact Analysis

Sector	CBAM Exposure	CRMA Exposure	Carbon	Investment Priority	CIRUU Role
Steel	VERY HIGH	HIGH (iron ore, coking coal)	Intensity 1.8–2.0 tCO2/t	Green steel, DRI, H2 reduction	Supplier compliance, offtake structuring
Aluminium	HIGH	MODERATE (bauxite)	8–16 tCO2/t (smelting)	Renewable power smelting	Power sourcing, CBAM readiness
Cement	HIGH	LOW	0.6–0.8 tCO2/t	CCS, clinker substitution	MRV advisory, ETS strategy
Fertilizers	HIGH	MODERATE (phosphates)	1.5–2.5 tCO2/t (ammonia)	Green ammonia, electrolysis	Compliance, hydrogen advisory
Hydrogen	MODERATE	HIGH (PGMs for electrolysis)	Varies by colour	Green H2, PtX applications	Project screening, bankability
Mining/ Minerals	LOW (direct)	VERY HIGH	0.5–1.5 tCO2/t	Processing, beneficiation	Supply chain, partnership design

Steel and cement face the highest combined regulatory pressure, with CBAM certificate costs rising from 2–5% of product value in 2026 to 15–25% by 2034 as free allowances phase out. Aluminium is uniquely sensitive to power costs, making renewable electricity access the decisive competitive factor. Fertilizers face structural transformation as green ammonia replaces Haber-Bosch synthesis. Hydrogen benefits from CBAM protection as a covered good, creating market incentives for EU green hydrogen production while penalising grey imports.

9. Risk Register: Top Risks and Mitigation Framework

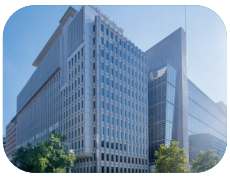
RISK MANAGEMENT IMPERATIVE

The Europe-Africa energy landscape presents interconnected risks across regulatory, geopolitical, financial, operational, and market dimensions. Effective risk management requires an integrated framework, not siloed compliance. Our assessment identifies 35 discrete risks across 7 categories; the top 10 are presented here.

Top 10 Critical Risks

#	Risk	Category	Score	Mitigation
1	**CBAM scope expansion to 180 downstream products**	Regulatory	20/25	Pre-emptive supply chain mapping; engage EU consultation process
2	**EU ETS price spike above EUR 150/t**	Market	20/25	Hedging strategy; accelerate decarbonisation investment
3	**China export controls on critical minerals**	Geopolitical	20/25	CRMA project pipeline; African sourcing diversification
4	**MRV infrastructure gaps in African exporters**	Operational	16/25	DFI co-financing; technology transfer; CIRUU advisory
5	**African sovereign fiscal/ political instability**	Geopolitical	16/25	Political risk insurance; multi-country diversification
6	**Hydrogen offtake uncertainty**	Market	15/25	Staged build-out; anchor demand contracts; blended finance
7	**Free allowance phase-out acceleration**	Regulatory	15/25	Scenario planning; early CBAM certificate procurement
8	**Currency risk in Africa-linked investments**	Financial	15/25	Local-currency financing; DFI guarantees; forex hedging
9	**Grid congestion delaying renewable build-out**	Operational	12/25	Grid pre-investment; distributed generation; storage
10	**Water stress impacting mining/processing**	Environmental	12/25	Dry processing technology; water recycling; site selection

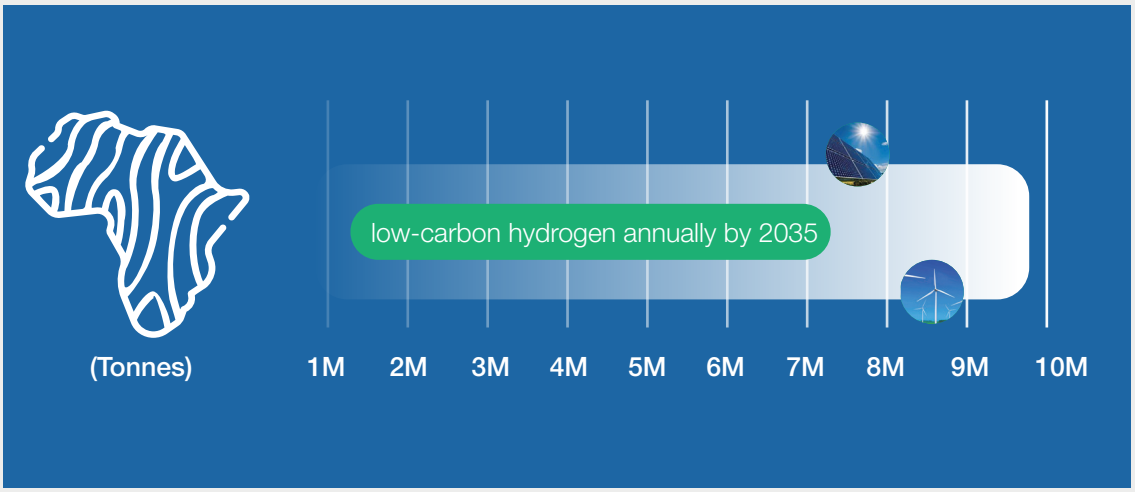
Early Warning Indicators (2026–2028)

CBAM		Monitor EU Commission downstream product review (expected 2027); track scope expansion legislative proposals
ETS Price		Weekly ETS futures curve, signal at EUR 120/t sustained for 30+ days
China		Export licence requirements for graphite, gallium, germanium monitor for extension to lithium, cobalt, rare earths
Africa Power		Track Mission 300 connection targets vs. actuals; grid reliability KPIs in key export countries
CRMA Projects		Monitor execution rate of Round 1 strategic projects fewer than 60% on-schedule by Q4 2027 signals systemic delivery risk
DFI Flows		Track quarterly disbursement from Global Gateway, World Bank IDA, AfDB against committed pipeline

10. Green Hydrogen and Power-to-X (PtX) Corridor

HYDROGEN OUTLOOK

Africa could produce over 9 million tonnes of low-carbon hydrogen annually by 2035, leveraging the world's best solar and wind resources. However, the strategic question is sequencing: projects are being announced before sufficient clarity exists on offtake, power access, and cost of capital. Without anchor demand and staged build-out, the Africa-Europe hydrogen corridor risks becoming a pipeline of stranded announcements.



Country Hydrogen Profiles

Country	Advantage	Key Project/Partnership	Readiness
Namibia	Solar irradiance, EU partnership	First green iron facility (Apr 2025)	HIGH
South Africa	PGM reserves (91% global), H2 strategy	FuelCell Energy partnership, EUR 2B allocation	MODERATE-HIGH
Morocco	EU proximity, renewable build-out	MASEN green hydrogen, ammonia export	MODERATE-HIGH
Egypt	Suez corridor, industrial capacity	Ain Sokhna green H2/ ammonia hub	MODERATE
Kenya	Geothermal baseload, East Africa hub	Lake Turkana wind, geothermal H2 pilot	EMERGING

Power-to-X Applications

For fertilizer production and maritime fuel. Largest near-term market. Africa's renewable advantage enables cost-competitive production for EU import.

Direct reduced iron using green hydrogen replaces coking coal. Namibia's green iron facility is the proof-of-concept for this pathway.

For fertilizer production and maritime fuel. Largest near-term market. Africa's renewable advantage enables cost-competitive production for EU import.

High-temperature hydrogen for cement, glass, and chemicals processing. Displacement of natural gas in EU industrial facilities.

Infrastructure requirements for the Africa-Europe hydrogen corridor include EUR 20–30B in investment across electrolyser capacity (20–40 GW by 2035), port and ammonia terminal upgrades, potential pipeline connectivity (SoutH2 Corridor from North Africa), desalination for water supply, and storage facilities. The critical path constraint is not technology but bankable offtake and cost of capital.

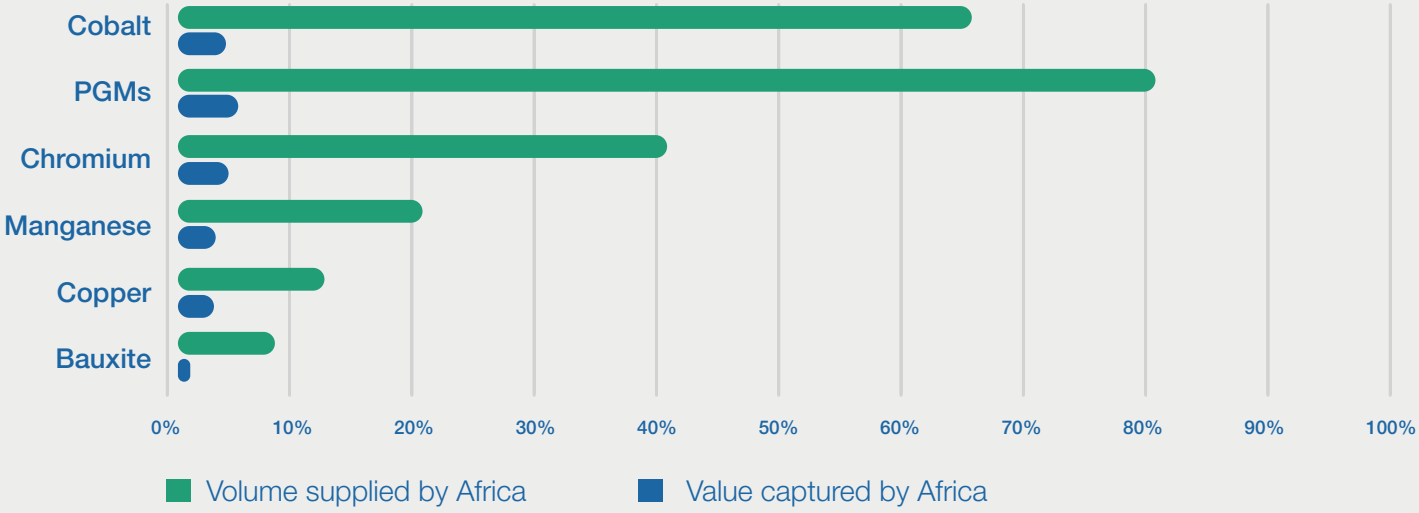
11. Critical Minerals Value Chain: Extraction to Processing

VALUE CHAIN REALITY

Being central to mineral supply does not automatically translate into development gains for Africa. Without power reliability, transport corridors, processing capacity, and fiscal stability, resource endowment simply feeds raw export dependence. Africa captures less than 5% of value in minerals it supplies 40–60% of by volume.

Volume supplied vs value captured: Africa vs the world

Africa's share of global mineral volume (%) versus share of final processed value (%) across key minerals



Five Stages of the Value Chain

Stage	Description	Africa's Position	Value Capture
1. Exploration	Geological survey, resource estimation	Strong—rich deposits identified	Minimal—pre-revenue
2. Extraction	Mining, ore production	Dominant—DRC cobalt, SA PGM	Low—2–5% of final value
3. Processing	Refining, chemical conversion	Minimal—<10% global share	High—20–40% of final value
4. Components	Battery cells, magnets, alloys	Near zero	Very high—30–50% of value
5. End-Use	EVs, turbines, electronics	Near zero	Highest—40–60% of value

Partnership Models for Value Addition

Joint Ventures

EU-African firm partnerships with shared equity, technology transfer, and processing commitments. EU firms contribute technology and market access; African partners contribute mineral access and local knowledge.

Clean Trade and Investment Partnerships (CTIPs)

New EU framework replacing pure offtake with reciprocal industrial commitments processing, jobs, and infrastructure investment tied to market access.

Processing Hub Co-Development

DFI-backed industrial zones (e.g., Zambia's Multi-Facility Economic Zone) combining mining, refining, power, and transport infrastructure.

Skills and Technology Transfer

Structured programmes for processing expertise metallurgy, chemical engineering, quality assurance funded through CBAM-generated revenues.

Offtake with Beneficiation Conditions

Long-term supply agreements that require progressive local processing (e.g., 30% refined in-country by Year 5, 50% by Year 10).

The beneficiation debate is central to Europe-Africa minerals partnership. African governments are increasingly legislating local processing requirements. The EU must recognise this as rational development strategy not protectionism and design partnerships that accommodate progressive value addition while securing diversified supply.

12. Action Agenda

Many organisations understand the strategic direction but still do not know how to begin. The practical answer is to organise action into a staged programme. The aim is not to solve every issue at once; it is to establish control, prioritise exposures, and build decision-grade visibility quickly. For Europe-based importers and manufacturers, the priority is exposure clarity and governance. For Africa-linked exporters and project platforms, the priority is evidence quality, power strategy, and investor readiness. For investors, the priority is portfolio screening and monitoring. These pathways are related and can often be delivered in parallel.

Board Questions That Should Now Be Asked

- Do we know our true CBAM exposure by product, legal entity and supplier, and can management evidence it quickly?
- Which suppliers are strategically important but evidence-poor, and what is our plan if they cannot meet our data expectations?
- How exposed are we to single-country or single-refiner dependence in critical materials or processed inputs?
- Are our decarbonisation investments also improving competitiveness and resilience, or are they adding cost without strategic protection?
- Where do we need Europe-Africa partnerships to secure power, materials, market access or financing optionality?
- Do our investment committees explicitly test geopolitical concentration, infrastructure dependencies and policy durability?

> **These questions matter because the next competitive gap will not only be created by better technology. It will be created by better integration of policy, supply chains, financing and operating reality. That is the gap CIRUU is well placed to close for clients. This means CIRUU organises its offer around problem clusters rather than abstract themes. On CBAM, the offer is governance and importer readiness. On CRMA, it is exposure mapping, sourcing strategy and investment intelligence. On Europe-Africa financing, it is bankability, investor messaging, and cross-border risk structuring. On monitoring, it is a live intelligence capability that tracks policy, market, financing and project-execution signals relevant to client portfolios. Commercially, the most powerful differentiator will be evidence-based advisory tied to decisions.**

CIRUU Energy: Strategic Positioning and Call to Action

CIRUU'S VALUE PROPOSITION

The next competitive gap will not be created by better technology alone. It will be created by better integration of policy, supply chains, financing, and operating reality. CIRUU Energy exists to close that gap for its clients bridging the distance between regulatory complexity and investable action across the Europe-Africa energy market.

Better Integration of Policy

Better Integration of Supply Chains

Better Integration of Financing

Operating Reality

Conclusion

CBAM and CRMA are often discussed separately, but the markets are already converging them. Together they reveal Europe's deeper strategic shift: resilience now sits at the intersection of carbon, competitiveness, materials and capital. This is not a passing regulatory phase. It is a new operating environment for energy and industrial decision-makers. Europe's success will depend on whether it can make clean industry affordable, not merely compliant; whether it can diversify critical-minerals supply chains beyond declaratory targets; and whether it can build credible partnerships with Africa that support both resilience and development. Africa's success will depend on whether it can convert market attention into power-system improvement, industrial upgrading, better MRV, stronger financing structures and more value added at source. For corporate leaders, investors and policymakers, the practical test is straightforward: can they integrate trade rules, energy economics, mineral strategy and project finance into one decision framework? CIRUU's opportunity is to help them do exactly that.

For the complete intelligence series, strategic advisory, partnership discussions, or intelligence subscriptions, contact CIRUU Energy info@ciruuenergy.com

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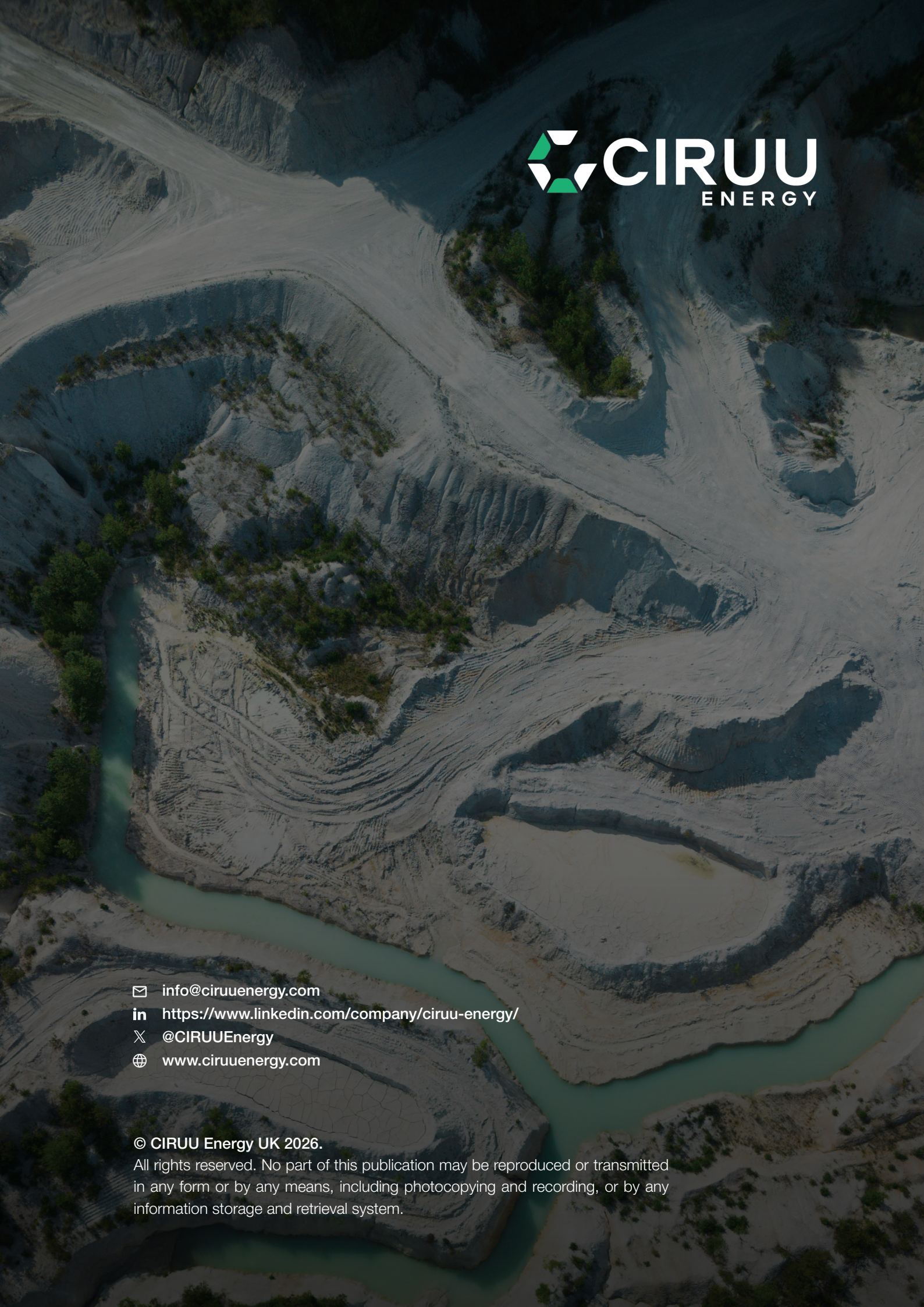

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