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Diversifying the midstream: Türkiye's role in a prospective Africa–Europe critical minerals corridor

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1. Introduction and conceptual framing

The shift to decarbonised and digital economies has increased the strategic importance of critical minerals. Materials such as lithium, cobalt, rare earth elements (REEs), graphite, nickel and copper now underpin clean-energy and defence technologies, from electric vehicles and wind turbines to batteries and grids (Müller et al., 2025). Meeting a 1.5 °C climate target could raise demand for several of these minerals by factors of 2.6 to 267, depending on the mineral and scenario (Wang et al., 2022). The energy sector accounted for 85% of demand growth in battery metals — lithium, nickel, cobalt and graphite — over the past two years, and its weight continues to rise: under the International Energy Agency (IEA)'s Net Zero Emissions by 2050 Scenario, energy technologies' share of total cobalt demand rises from 30% in 2024 to over 55% by 2040, while electrification accounts for 95% of additional lithium demand to 2035 (IEA, 2025a).

Rising demand has increased the importance of Africa's mineral resources (Zhe and Sun, 2025) and intensified competition over mineral supply chains (Vakulchuk et al., 2020; Hira, 2025). Most analysis, however, focuses on the two ends of the value chain — upstream extraction and downstream consumption — and pays less attention to the midstream refining stage between them, where ores and concentrates become battery-grade and metallurgical inputs.

The IEA identifies midstream refining, not mining, as a particularly acute bottleneck in critical-mineral supply chains (IEA, 2025a). China dominates this segment, refining 70% of global lithium and 75% of cobalt, separating 85% of magnet REEs and producing over 90% of battery-grade graphite (IEA, 2026). As a result, even where mining is diversified, downstream industries depend on Chinese refining, which has prompted reassessments of industrial, trade and security policy.

The EU's 2024 Critical Raw Materials Act (CRMA) defines the challenge as value-chain security rather than resource availability and promotes domestic and partner-based refining, recycling and permitting to reduce concentration risks (European Commission, 2019, 2024; Jamasb et al., 2025). This reflects a broader literature that treats critical minerals as geopolitical assets (Zhou and Månberger, 2024; Ufimtseva et al., 2024; Yuan et al., 2024; Crochet and Zhou, 2024) and identifies refining concentration, demand growth and price volatility as the principal supply-chain vulnerabilities (IEA, 2021; European Commission, 2023; USGS, 2025).

Much of the geopolitical literature interprets these dynamics through resource nationalism and economic statecraft (Zhe and Sun, 2025; Hafner and Tagliapietra, 2020; Maltais et al., 2026). Klare (2012) warns of a "resource curse", while Overland et al. (2019) stress that minerals, unlike combusted fuels, remain embodied in products and can often be recycled. The literature largely focuses on great-power rivalry, giving little attention to middle powers as industrial or logistical intermediaries and often equating mining with supply security, which leaves refining capacity comparatively underexamined.

This article combines energy geopolitics, middle-power theory and supply-chain resilience. Research on renewable-energy geopolitics argues that as energy systems electrify, strategic leverage increasingly depends on control of the infrastructure and networks that connect producers and consumers, not only on ownership of resources (Scholten and Bosman, 2016). In critical-mineral supply chains, refining capacity is a major source of strategic leverage alongside resource ownership (IEA, 2025a); industrial capability therefore becomes an important determinant of influence.

Traditional middle-power theory emphasises diplomacy, coalition-building and normative bridging (Cooper et al., 1993; Chapnick, 1999). Recent work extends middle-power theory to production networks, showing how states gain influence through specialised positions within global value chains (Stöllinger, 2019; Van Assche and Warin, 2019). These positions include high-value activities, functional upgrading beyond the middle-income trap, and the acquisition of foreign capabilities through internationalisation. Indonesia's nickel strategy illustrates this in practice, turning industrial policy into influence within the electric-vehicle battery value chain (Arkananta, 2025).

Existing concepts such as transit states or logistics hubs do not capture this position, because they describe the movement of goods rather

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than the industrial transformation within value chains. This article therefore defines a midstream power as a state that gains influence by refining and coordinating mineral flows rather than by owning deposits or manufacturing final products. The term is analytical, denoting positional capacity rather than coercive influence. Türkiye's role depends on three dimensions, examined below: selective refining capability — the capacity to convert raw minerals into semi-finished inputs such as battery-grade chemicals or separated oxides; logistical and regulatory connectivity — port, rail and corridor infrastructure combined with EU-facing regulatory familiarity; and value-chain governance — the capacity to coordinate mineral flows through diplomacy, trade facilitation and investment rather than ownership. Together, these capabilities could enable Türkiye to refine selected minerals, coordinate trade and connect African producers with European manufacturers, if commercial-scale processing develops.

Supply-chain resilience theory adds a third element, stressing diversification and redundancy against concentrated risk (Christopher and Peck, 2004; Sheffi and Rice, 2005; Blakemore and Engelke, 2025). The CRMA applies this through a 2030 benchmark under which no more than 65% of the Union's annual consumption of each strategic raw material, at any relevant processing stage, should come from a single third country (European Commission, 2024); alternative refining capacity, however, is slow to develop because new projects are capital-intensive and unevenly distributed.

Türkiye is a prospective intermediary of this kind. It cannot rival China's scale, but it may develop selective, high-value refining that supports regional diversification. Its proximity to African producers and European consumers provides a geographical advantage, while its metallurgical and chemical base, expanding engagement in Africa and growing alignment with EU frameworks strengthen its potential role. Together, these factors could reduce regional midstream vulnerabilities without displacing existing producers. This combination distinguishes Türkiye from other intermediaries and makes it an analytically useful case for developing the concept of a midstream power: a state that exhibits the enabling conditions while remaining below the commercial threshold offers the sharpest test of the distinction between intermediary capacity and midstream power.

Despite these attributes, Türkiye remains underexplored in the critical-minerals literature, which focuses either on specific endowments or national criticality assessments (Turker et al., 2023; İlhan et al., 2020; Ozturk et al., 2019; Yaylali et al., 2020; Gocmen Polat et al., 2023) or on Türkiye–Africa relations from a diplomatic or developmental angle (Donelli, 2021). Recent scholarship has begun to theorise the geopolitics of mineral processing itself (Deberdt et al., 2026), but that work maps how states, from great powers to regional actors, seek to secure, control or bypass processing chokepoints, without engaging middle-power theory; to the author's knowledge, no study has examined Türkiye's role as a value-chain intermediary between producer and consumer regions, even though EU policy identifies Türkiye as a significant third-country supplier of critical raw materials (European Commission, 2023).

This study therefore analyses the enabling conditions and institutional prerequisites under which an Africa–Türkiye–Europe corridor could emerge. The article does not claim that such a corridor already exists; it assesses whether Türkiye possesses the industrial, logistical, regulatory, and diplomatic capabilities to function as a selective midstream intermediary should such a corridor develop. The study asks: under what conditions can Türkiye function as a prospective midstream intermediary between African production and European demand, and how might this affect Africa–Europe–China dynamics?

The paper proceeds as follows. Section 2 examines the global midstream bottleneck and China's refining dominance. Section 3 sets out the methodology and the reproducible EU–Türkiye comparison. Section 4 assesses the Africa–Türkiye–Europe corridor and the gaps to be closed. Section 5 conceptualises and assesses Türkiye's midstream role across its industrial, energy, diplomatic and regulatory foundations, including a mineral-specific analysis and the structural constraints it faces. Sections 6 and 7 develop the strategic implications for the EU, Africa and China, and conclude with directions for future research.

2. Global context: China's midstream dominance in critical minerals

China dominates global critical-mineral refining. As of 2025 it refines 70% of the world's lithium and 75% of its cobalt, separates 85% of magnet REEs and produces over 90% of battery-grade graphite (IEA, 2026) — a position built over decades through industrial policy, state-led investment and vertical integration across mining, refining and manufacturing (Zhou and Månberger, 2024; Hurst, 2010). From the 1990s, Chinese firms combined overseas mining with expanding domestic refining, integrating upstream supply into a midstream-centred strategy (Wübbeke, 2013).

By the early 2000s, this approach had become an external resource strategy spanning Latin America, Africa, Eurasia and Southeast Asia. It was financed through the Belt and Road Initiative (BRI), state-owned enterprises and policy banks. Between 2000 and 2021 China provided USD 56.9 billion in official-sector financing for mining and refining across nineteen countries (Walsh et al., 2025; IEA, 2025a), and 2024 outbound metals-and-mining investment reached USD 21.4 billion — about 18% of BRI-related flows (IEA, 2025a).

Beyond formal BRI channels, Chinese state-owned banks have financed overseas projects through limited-recourse lending tied to long-term offtake agreements, often via equity joint ventures (IEA, 2025a). This state-led model contrasts with the more private-capital approaches of the EU and US, and reflects China's emphasis on long-term supply security rather than short-term financial returns.

Control over refining enables China to use export restrictions and licensing as instruments of economic statecraft over supply access and pricing — as illustrated by the reported de facto suspension of REE exports to Japan during the 2010 dispute (Mancheri, 2015), with export controls later consolidated in the 2020 Export Control Law (Kalantzakos, 2020). Controls have since intensified: a ban on gallium, germanium and antimony exports to the United States in December 2024; restrictions on tungsten, tellurium, bismuth, indium and molybdenum in early 2025; and licensing for several REEs, including dysprosium and terbium, by April 2025 (IEA, 2025a).

These export controls extend China's use of mineral trade as a strategic policy tool and have raised concerns about supply reliability. In response, the EU, US and East Asian economies have accelerated diversification and "friend-shoring" to reduce midstream exposure (Vivoda, 2023).

For the EU, China's refining dominance creates three vulnerabilities: geopolitical disruption, price volatility and technological dependence. European manufacturers rely heavily on Chinese intermediates for batteries, magnets and clean-energy technologies. These dependencies are concentrated in a few suppliers: the EU sources 79% of its lithium from Chile, while China supplies more than 90% of its magnesium and 85–100% of its REEs (European Commission, 2023). Refining concentration has shifted much of the value added in critical-mineral supply chains to East Asia, leaving many mining countries dependent on exporting raw materials and many manufacturing economies dependent on imported refined products. China's position therefore illustrates how control of the midstream can generate geoeconomic influence alongside resource ownership. This observation provides the basis for the concept of a midstream power developed in this article. Section 4 examines how Africa's endowment and Europe's supply-security needs could interact within a prospective Africa–Europe corridor, following the methodology set out in Section 3.

3. Methodology: comparing the EU and Turkish critical-mineral frameworks

This section measures the designation overlap between the European Union and Turkish critical raw material designations and documents the procedure in full, so that the figures can be reproduced from the two primary sources. The complete item-by-item coding is provided in Appendix A. Explicit coding rules matter because existing commentary asserts EU–Türkiye convergence without a stated denominator, and the reported level of overlap depends strongly on those coding choices.

3.1. Design and corpus

The study is a qualitative comparative policy analysis. The unit of analysis is the individual designated raw material. The comparison is based on two authoritative policy documents. The EU Critical Raw Materials Act (Regulation (EU) 2024/1252) lists 17 strategic raw materials (Annex I) and 34 critical raw materials (Annex II, the broader set, which incorporates all strategic materials). Türkiye's Critical and Strategic Minerals Report (MENR, 2025) scores 37 minerals as critical, sorted into three tiers — high-importance (8), important (19) and potential (10) — and separately designates 26 strategic (defence) minerals, ten of which are also among the 37 critical. The primary comparison uses Türkiye's 37-mineral critical list. Several of the primary sources — including the Turkish designation framework itself — are available only in Turkish; the analysis reads and translates them directly, preserving original titles and table references, and thereby brings to an international readership material not previously examined in the English-language literature. The analysis concerns regulatory designation only: the official documents serve here as the object of analysis — evidence of what each framework formally designates — not as evidence of industrial capability, which is assessed separately (Sections 5.5–5.6) against independent sources where these exist and otherwise identified as government-reported.

3.2. Different selection logics

A direct list-to-list comparison is complicated by a structural asymmetry. The EU lists are a threshold output — a material is critical only above defined economic-importance and supply-risk thresholds — whereas the Turkish methodology classifies all 37 assessed minerals as critical and then ranks them by tier. The two frameworks therefore share no common denominator, and any single "overlap" figure depends on which Turkish tier is compared against which EU list and on how aggregated groups are treated. Rather than obscure this sensitivity, the analysis reports several transparent measures.

3.3. Coding rules

Six rules are applied symmetrically; they are stated in full, with the resulting classification of every designation, in Appendix A. Rare-earth elements and platinum-group metals are each treated as a single designation on both sides, which avoids the double-counting that would otherwise arise from matching one aggregated entry against several individually named elements. Aluminium is matched across the bauxite–alumina–aluminium chain. Turkish coal (lignite-dominated) is not matched to EU coking coal, as the two are materially different commodities. Chromium is recorded as Türkiye-only: it appears on Türkiye's critical list but was removed from the EU critical list after the 2017 assessment. Uranium is reported for completeness but excluded from the primary comparison: it appears only on Türkiye's strategic (defence) list, and nuclear fuels fall outside the CRMA's scope.

3.4. Calculation rule and results

After harmonisation, the EU critical list comprises 33 unique designations and the Turkish critical list comprises 36; 21 designations are shared. Because the two lists differ in length and construction, overlap is reported under several denominators rather than as a single figure (Table 1). The primary reported measure is the directional coverage of the EU critical list by the Turkish framework — the share of EU-designated critical raw materials that Türkiye also designates — because it directly measures whether Türkiye recognises the materials the EU treats as critical.

In total, 63.6% (21 of 33) of the EU's critical raw materials are also designated as critical by Türkiye. Coverage increases to 82.4% (14 of 17) when the comparison is restricted to the EU's strategic raw materials — the EU's highest-priority subset — indicating that Turkish designation is most complete where EU priority is greatest. If Türkiye's separate strategic (defence) list is also counted, all 17 EU strategic raw materials appear on one of the two Turkish lists, as tungsten, magnesium metal and silicon metal are designated there (Appendix A). The symmetric Jaccard coefficient (43.8%) is reported as the most conservative bound.

To distinguish simple list overlap from overlap concentrated in high-priority materials, each Turkish mineral was weighted by its criticality tier (high = 3, important = 2, potential = 1). The EU-shared minerals account for 60.6% of Türkiye's total criticality weight (43 of 71 points). The unharmonised tier scores sum to 72 points ($8 \times 3 + 19 \times 2 + 10 \times 1$); collapsing platinum (potential tier, 1 point) and palladium (important tier, 2 points) into a single platinum-group designation coded at the higher tier reduces the denominator to 71 (Appendix A, Rule 2). All five EU-shared minerals that fall in Türkiye's top 'high importance' tier — aluminium, copper, lithium, manganese and titanium — are EU strategic raw materials. The overlap is therefore concentrated in the materials both jurisdictions rank most highly, not dispersed across marginal entries.

The areas of divergence show a clear pattern. The EU-only set is dominated by high-technology and electronics inputs absent from Türkiye's designation (e.g. hafnium, helium, scandium, tantalum, tungsten, the phosphate/phosphorus pair), whereas the Türkiye-only set is dominated by industrial and base-metal materials in which Türkiye has an established production position (e.g. chromium, iron, zinc, magnesite, boron-adjacent industrial minerals, lead, molybdenum). This pattern is examined further in the mineral-specific analysis: Turkish–EU complementarity is strongest in base and metallurgical materials and weakest in the high-purity electronics and battery-chemistry segment.

3.5. Scope and limitations of the comparison

This analysis measures designation overlap only. It establishes which materials the two jurisdictions jointly treat as critical or strategic; it does not, and is not intended to, demonstrate operational mineral flows, processing capacity, or contracted supply relationships between the

Table 1
Measures of designation overlap between EU and Turkish critical-mineral frameworks (full coding in Appendix A; source: author's calculations from Regulation (EU) 2024/1252 and MENR 2025).

Coding rule (denominator)	What it measures	Result	Ratio
Share of EU critical list also on Türkiye's national list	Coverage of EU critical priorities by the Turkish framework	63.6%	21/33
Share of EU strategic list also on Türkiye's list	Coverage of EU strategic (highest-priority) raw materials	82.4%	14/17
Tier-weighted coverage (high = 3, important = 2, potential = 1)	EU-shared minerals as a share of Türkiye's total criticality weight	60.6%	43/71
Share of Türkiye's list also on the EU critical list	Coverage of Turkish priorities by the EU framework	58.3%	21/36
Jaccard coefficient (shared ÷ union)	Symmetric overlap of the two full critical lists	43.8%	21/48

parties. The designation overlap is treated here as a necessary enabling condition for an intermediary role — a shared policy basis on which cooperation could be built — not as evidence that such intermediation currently occurs. Designation overlap thus establishes a shared policy priority, not comparable industrial capability — the latter is assessed separately in Section 5.5.

4. The prospective Africa–Türkiye–Europe critical-mineral corridor

4.1. Scope of the corridor claim

The term "corridor" can imply an operational structure the evidence does not support, so the claim here is bounded: the conjunction of Africa's upstream endowment, Europe's supply-security imperative and Türkiye's logistical–regulatory position creates the conditions under which Türkiye could act as a midstream intermediary. The paper does not claim that operational Africa–Türkiye–Europe flows exist: no such flows, contracted volumes or offtake agreements were identified in the public sources reviewed for this study, and demonstrating them is an empirical question for future research. The following analysis maps candidate pathways. For each, it identifies the African source, a plausible route, the Turkish capability identified in reviewed sources, the EU policy relevance and demand context, and the key missing enabling condition. Making these gaps explicit frames what follows as an analysis of a prospective corridor rather than an assertion of an existing one.

4.2. Africa's upstream weight and the value-capture gap

Africa's importance is clear from its documented reserve and production shares. The continent holds significant reserves of cobalt, graphite, manganese, bauxite and platinum, and supplies around 17% of copper and 11% of lithium output, with South Africa a leading producer of manganese and chromium (IEA, 2025a). The Democratic Republic of the Congo (DRC) alone accounts for roughly 74% of mined cobalt (USGS, 2026). Brookings similarly documents the gap: Ijjasz-Vasquez et al. (2026) report that Africa supplies about three-quarters of mined manganese yet refines only ~9% of copper and under 5% of other key minerals, capturing less than 1% of the global economic value from clean-energy manufacturing. The IMF similarly notes that domestic processing can multiply value several times over — unprocessed bauxite fetches ~ USD 65 per tonne against ~ USD 2335 for aluminium — even as such capacity remains scarce (IMF, 2024). The IEA estimates that moving up the value chain could raise Africa's mineral market value by almost three-quarters by 2040 (IEA, 2025b).

The value-capture gap has two implications (see §4.5): it creates an opportunity for an external processing partner, yet it is also the gap that African producer-state policies, particularly under the Africa Mining Vision, seek to eliminate through domestic beneficiation.

4.3. Türkiye's logistical and regulatory position

Türkiye's contribution to the corridor is logistical and institutional rather than, at present, demonstrated processing throughput. It hosts several high-throughput commercial ports and offers Eastern-Mediterranean gateways that provide alternatives to congested Northern European routes for East African shipments (e.g. via Dar es Salaam). It also sits within the Trans-Caspian Middle Corridor and EU-facing Balkan rail networks. The EU–Türkiye Customs Union, though it does not formally cover raw materials, can lower coordination and standards-compatibility costs relative to more distant suppliers (European Union–Turkey Customs Union, 1995). These are enabling conditions for aggregation, routing and re-export — but not evidence that African feedstock is currently processed in Türkiye and forwarded to the EU, which is the gap mapped below.

4.4. Candidate pathways (with named gaps)

Table 2 maps candidate mineral pathways; the third column states Türkiye's capability identified in reviewed sources at the relevant value-chain stage — examined in detail in Section 5.5 — and the final column names the key missing enabling condition. The cases are illustrative rather than exhaustive, selected to represent major African producers of minerals on the EU critical or strategic raw-material lists. The table should be read as an analytical framework identifying where a corridor could emerge and the enabling conditions still absent, not as a description of existing trade.

The most notable development reported in Table 2 — the Türkiye–Nigeria solid-minerals MoU of 21 May 2026 — is recent and significant, but its nature must be stated precisely. It is a memorandum covering exploration, technology transfer, capacity building and joint projects (building on a 2021 MoU; News Agency of Nigeria, 2026; Türkiye Today, 2026), not an offtake agreement, committed volume or operational flow. As such, it signals emerging political intent to strengthen Africa–Türkiye cooperation in the minerals sector rather than the existence of an operational corridor, and should therefore be interpreted as evidence of policy intent rather than material throughput. A joint technical working group has since been established to implement the memorandum (Anadolu Agency, 2026).

4.5. Whose value? Türkiye's intermediation and African beneficiation

The corridor must be assessed not only from the EU's diversification interest but against African producer-state interests. A central objective of African mineral policy is to move up the continent's own value chain, processing REEs into concentrates and progressively into smelting and refining at home. This agenda — supported by the Africa Mining Vision (African Union, 2009) and the African Green Minerals Strategy (AMDC, 2024) — aims to keep refining rents and skilled jobs domestic rather than captured abroad. Recent examples include a lithium-sulfate plant about to enter operation in Zimbabwe and nickel–manganese–cobalt precursor production in Morocco (Ijjasz-Vasquez et al., 2026). Relocating processing to a Turkish node could, without safeguards, reproduce the value leakage this agenda aims to end — inserting a new external layer between African producers and European consumers. Turkish intermediation is therefore compatible with African value capture only where it involves genuine technology transfer and capacity-building (as the Türkiye–Nigeria MoU nominally envisages), where offtake terms are transparent, where joint ventures include African ownership, and where it serves as a transitional bridge while domestic African refining matures rather than a permanent substitute. Where those conditions are absent, intermediation risks entrenching dependency in a new location. This conditionality is not a caveat appended to the argument but part of it, defining when the prospective corridor would be mutually beneficial rather than extractive.

4.6. Summary

On present evidence the Africa–Türkiye–Europe corridor is prospective rather than operational. Africa's endowment and value-capture gap, Europe's diversification imperative and Türkiye's logistical–regulatory position jointly form the enabling conditions for an intermediary role, and a recent but preliminary Türkiye–Nigeria MoU signals emerging intent. There is currently no documented operational flow of African feedstock through Turkish processing to EU markets, nor the commercial-scale refining such flows would require in the high-difficulty segments (as Table 2 makes explicit). The corridor is therefore a structural possibility conditioned on capability formation, transparent and beneficiation-compatible terms, and resolution of the named gaps — a direction of development rather than a present reality.

Table 2
Candidate Africa–Türkiye–Europe critical-mineral pathways: verified Turkish capabilities and enabling conditions.

African source & mineral	Illustrative routing (one plausible pathway)	Turkish node — capability identified in reviewed sources	EU policy relevance and demand context	Key missing enabling condition
DRC/Zambia Copper, cobalt	East African corridor (e.g. Dar es Salaam) → Eastern Mediterranean → Türkiye	Copper: existing smelting base, though Türkiye imports over half of its refined copper demand. Cobalt: no refining capability identified.	Copper and cobalt are EU strategic raw materials, central to EV/battery chains.	Cobalt-hydrometallurgy capacity (absent) and a sourcing/offtake agreement with a DRC/Zambia producer; no such agreement identified in publicly available evidence.
Zimbabwe Lithium	Southern African corridor (e.g. Beira/Maputo) → Eastern Mediterranean → Türkiye	Pilot only — ~10 t/y recovered from boron by-product; no commercial lithium-chemical refining.	Lithium is EU strategic; EU demand is projected to rise sharply.	Commercial-scale lithium-chemical refining (not yet established) and an African-feedstock contract; not demonstrated in publicly available evidence.
Mozambique/ Madagascar Graphite	Mozambique (e.g. Nacala)/ Madagascar (e.g. Toamasina) → Eastern Mediterranean → Türkiye	No documented battery-/anode-grade graphite processing.	Battery-grade graphite is EU strategic; over 90% of global battery-grade graphite processing occurs in China.	Anode-grade processing capacity; not yet established in Türkiye on present evidence.
South Africa PGMs, chromite	South African ports (e.g. Richards Bay/Durban) → Eastern Mediterranean → Türkiye	Chromite: ferrochrome via domestic smelting (verified — Türkiye's strongest midstream capability). PGMs: no documented processing capability.	PGMs are EU critical; chromium is not on the EU list (removed 2017).	PGMs: processing capability and a sourcing link (neither documented). Chromium: capability exists but no EU criticality pull (§5.5.1).
Morocco Phosphate	Mediterranean shipping → Türkiye	Existing fertiliser and phosphate-chemical processing base; no documented processing of Moroccan phosphate feedstock for EU-facing supply chains.	Phosphate rock and phosphorus are EU critical.	A sourcing linkage and a defined EU-facing product; not demonstrated in publicly available evidence.
Guinea Bauxite	Atlantic → Mediterranean shipping → Türkiye	Established primary aluminium smelting by Eti Alüminyum; no documented processing of Guinean bauxite or alumina for EU-facing supply chains.	Bauxite/alumina/aluminium is designated by both the EU (strategic and critical) and Türkiye (aluminium, high-importance tier).	A sourcing linkage and demonstrated capacity to process imported feedstock; neither identified in the sources reviewed.
Nigeria Lithium, cobalt, REE, tin, tantalum (44+ minerals)	Atlantic shipping → Mediterranean → Türkiye	No operational Turkish processing of Nigerian feedstock.	Several Nigerian minerals — including lithium, cobalt, rare earth elements and tantalum — appear on the EU critical list.	Existing political signal: Türkiye–Nigeria solid-minerals MoU (21 May 2026, Istanbul Natural Resources Summit), covering exploration, technology transfer and capacity-building. Missing: commercial offtake agreements, committed volumes and operational processing flows.

Note: Routes are illustrative, geographically plausible maritime pathways — one of several possible export gateways in each case — and should not be read as evidence of existing commercial mineral flows.

5. Conceptualising and assessing Türkiye's prospective midstream role

This section specifies the concept of a midstream power introduced in Section 1 and applies it to Türkiye: a midstream power is a state whose strategic relevance depends not on resource ownership or end-product manufacturing but on intermediary transformation within global value chains — refining capacity combined with regulatory intermediation. The concept is deliberately narrower than adjacent notions. Unlike a transit state or logistics hub, which moves material without transforming it, a midstream power transforms intermediate mineral inputs before they continue through the value chain. Unlike a gateway economy or standards broker, which mediates access or rules rather than substance, it combines that transformation with coordination of the onward flow; it is more than a value-chain platform because it involves transformation, not merely orchestration.

The threshold is therefore capability-based: logistical and regulatory compatibility are necessary but not sufficient, and a state qualifies only when it also performs selective transformation at commercial relevance — understood here as sustained industrial processing beyond pilot or demonstration scale, assessed mineral by mineral in Section 5.5. By this threshold Türkiye is, on present evidence, a prospective rather than an actual midstream power — it possesses the enabling conditions but not yet the commercial-scale processing the concept ultimately requires.

The threshold is demanding but attainable by a non-hegemonic state, as Japan shows. Japan refines copper, nickel and cobalt at commercial scale and is among the destinations for new lithium-hydroxide refining projects (IEA, 2025a). Its coordination instruments are equally developed: the Japan Organization for Metals and Energy Security (JOGMEC) provides loans, guarantees and equity investment tied to offtake for Japanese buyers; Japanese co-financing sustains the Australian company Lynas, whose Malaysian separation plant constitutes the principal rare-earth refining outside China; and recent arrangements allocate to Japan around half of Lynas's future heavy rare-earth oxide production through the Japan–Australia Rare Earths partnership (IEA, 2025a, 2026). Japanese firms also hold major positions in refined copper production abroad despite limited domestic output — indicating that midstream power can rest on controlled, not only onshore, capacity (IEA, 2025a). Japan thus occupies the category that Türkiye has not yet entered: commercial transformation combined with onward coordination. The question for Türkiye is therefore not whether the role is achievable, but whether the enabling conditions documented below can mature into it. Japan serves here as a reference point for the threshold, not as a second case study; its trajectory from the 2010 export shock to threshold-crossing warrants the comparative study proposed in Section 7.

5.1. Türkiye's geographic proximity and logistics networks

Türkiye's position at the intersection of Europe, Asia and Africa gives it a potential intermediary position linking African resources to European industry. It hosts five ports ranked among the world's top 100 by container throughput (Republic of Türkiye Investment Office, 2025a), with Eastern-Mediterranean gateways offering alternatives to congested Northern European routes for East African shipments. It also sits within the Trans-Caspian Middle Corridor linking Central Asia and the Caucasus to Europe (Şenol and Üçışık Erbilen, 2022), whose rail, port and customs infrastructure suits bulk mineral flows (Republic of Türkiye Ministry of Foreign Affairs, 2025).

Recent Organization of Turkic States meetings have raised extending it into mining and critical minerals (Organization of Turkic States, n.d.; TRT World, 2025), and Balkan rail through Bulgaria and Romania integrates Anatolian logistics into EU-facing networks (European Commission, n.d.). Although the EU–Türkiye Customs Union, in force since 1995, does not formally cover raw materials, it has created strong regulatory and institutional compatibility that can lower coordination costs relative to more distant suppliers, allowing Turkish consolidation and refining to function as a proximate node oriented to EU markets.

5.2. Industry in Türkiye: existing metallurgical and chemical base

Türkiye's metallurgical and chemical base supports critical-mineral refining. Steelmaking and base-metal smelting differ technologically from hydrometallurgical or solvent-extraction refining, but share transferable competencies — metallurgical thermodynamics, materials handling, process control — and a surrounding ecosystem of energy, chemicals, utilities and skilled labour. Türkiye ranks among the world's top ten steel producers (33.7 Mt in 2023; World Steel Association, 2024) and hosts established aluminium and copper smelting within integrated industrial clusters (Republic of Türkiye Ministry of Trade, 2023; Istanbul Chamber of Industry, 2022; Eti Alüminyum, n.d.; MENR, n.d.). Their significance lies less in technological equivalence to lithium or REE refining than in a mature process-engineering ecosystem capable of absorbing new technologies.

This base is reinforced by petrochemical and inorganic-chemicals industries that already produce, at scale, the chemical reagents required for mineral processing — sulfuric and hydrochloric acid, sodium hydroxide and solvents — through chlor-alkali, acid and trona operations, supported by domestic rock-salt and trona reserves and chemical clusters (Ozguner, 2022). This lowers the capital and logistics cost of pilot hydrometallurgical and separation facilities relative to greenfield projects.

Early initiatives show this capacity being put into practice. Eti Maden's pilot lithium facility in Eskişehir, recovering lithium from boron by-products, was launched in December 2020 with a reported capacity of approximately 10 tonnes per year — proof of concept rather than commercial scale (Anadolu Agency, 2020). At Beylikova, the Fluorite, Barite and Rare Earth Elements pilot has begun initial production of seven rare-earth oxides from a large deposit whose size is not yet independently certified (Anadolu Agency, 2022, 2023, 2025b; Turker et al., 2023). Beyond extraction, the project aims to develop beneficiation, hydrometallurgical processing and solvent-extraction purification, extending Türkiye's participation along the rare-earth value chain (Turker et al., 2023).

Türkiye states — at presidential and ministerial level — that these efforts aim to join the world's top five rare-earth producers through international partnerships, with a full-scale plant scheduled to break ground in 2026 and production targeted within two years (Anadolu Agency, 2025b; Bloomberg HT, 2025; BBC News Türkçe, 2025) — indicating that the capability remains prospective and partnership-dependent. A boron-enhanced lithium-ion battery prototype developed with the Scientific and Technological Research Council of Türkiye (TÜBİTAK) has also been reported as ready for serial production, indicating an early link between refining and advanced materials (Anadolu Agency, 2024).

This base is only partially transferable: lithium refining, rare-earth separation and cobalt hydrometallurgy rely on high-purity, multi-stage solvent-extraction circuits distinct from conventional smelting (Binnemans et al., 2013), so competitive capacity will depend on sustained investment, technology partnerships and workforce development. Türkiye's metallurgical expertise, chemical infrastructure and regulatory maturity nonetheless make it an industrially prepared platform for selective midstream specialisation.

5.3. Energy system advantages

Reliable, scalable energy is a prerequisite for refining, one of the most energy-intensive value-chain segments — a requirement that sharply differentiates Türkiye from many African producer states, where more than 600 million people lack electricity access and weak grids constrain domestic beneficiation (IEA, 2022). Türkiye combines supply security with growing decarbonisation. Its diversified gas portfolio cushions industry from volatility: in 2024 it imported 52.2 billion m^3, principally from Russia (41.3%), Azerbaijan (22%) and Iran (13.5%), with the remainder as liquefied natural gas (LNG) (EMRA, 2024).

It has also expanded renewable-energy capacity rapidly. Renewables now account for more than 58% of Türkiye's installed electricity capacity, positioning the country among Europe's leading renewable-energy markets. Building on this expansion, the government's Renewable Energy 2035 Roadmap targets 120 GW of combined wind and solar capacity by 2035, supported by major investments in generation and transmission infrastructure. This expansion is expected to increase the availability of low-carbon electricity increasingly required under evolving EU sustainability and carbon-competitiveness standards (Republic of Türkiye Investment Office, 2025b; MENR, 2024a).

Baseload supply will be reinforced by the Akkuyu Nuclear Power Plant (4.8 GW across four VVER-1200 reactors), whose first unit is expected to begin generation in late 2026 (World Nuclear Association, 2025), while the 2023 National Hydrogen Strategy targets 2 GW of electrolyser capacity by 2030, with potential industrial applications including metallurgy and chemicals (MENR, 2023). Together, reliable gas and expanding renewable, nuclear and hydrogen capacity make Türkiye's energy system a potential enabler of lower-emission refining rather than a basic industrial input.

5.4. Türkiye's soft power and diplomatic footprint in Africa

Türkiye's expanding engagement in Africa provides diplomatic foundations for stable mineral partnerships through soft-power instruments — diplomacy, development cooperation and cultural affinity — and is commonly presented as a culturally proximate rather than neo-colonial partner (Ozkan, 2012; Akpınar, 2021). Since the 1998 ‘Opening to Africa’ policy, Turkish embassies have grown from 12 to 44, Turkish Airlines serves 56 destinations across 39 African countries, and bilateral trade rose from USD 5.4 billion (2003) to USD 37 billion (2024) (Republic of Türkiye Ministry of Foreign Affairs, n.d.; TABEF, n.d.; Anadolu Agency, 2025a). Turkish contractors have completed over 2000 projects worth nearly USD 100 billion, with foreign direct investment above USD 10 billion, complemented by Turkish Cooperation and Coordination Agency (TİKA) and cultural institutions (TİKA, 2024).

For African states, refining cooperation with Türkiye offers a pragmatic complement to domestic beneficiation under the Africa Mining Vision, given persistent capital, infrastructure and technology constraints (African Union, 2009); joint Turkish–European ventures could link African production to European demand as a transitional rather than substitutive model (Tanchum, 2021; UNECA, 2018). For Europe, Türkiye's proximity and experience serving EU-facing industrial markets could facilitate diversification away from Chinese refining, although compliance with project-specific environmental, carbon-accounting, traceability and due-diligence requirements would still need to be demonstrated (Dursun, 2024). This relational capital — not resource ownership — is the political foundation of Türkiye's prospective intermediary role.

5.5. Mineral-specific midstream capability: where Türkiye can and cannot act

The preceding analysis treated critical minerals as one designation category, which is insufficient: Türkiye's plausible midstream role varies by mineral, and conflating them overstates capability where it is weakest. This section groups Türkiye's position by mineral into capability tiers (strong, moderate, weak/pilot; Table 3) and, where sources permit, names the value-chain stage reached. A constraint applies: stage-level operational data is, for most minerals, not published by Turkish government or industry sources, and where it does not exist the analysis says so — a limitation of the public evidence base that disciplines the claims below.

The value-chain ladder runs: ore → concentrate (beneficiation) → smelting → refining → separation (for rare earths) → battery-grade chemicals → precursors/cathodes → cells. Türkiye's verified positions cluster at the smelting/early-processing end for base and metallurgical materials, and at the pilot/pre-commercial end for high-purity separation and chemicals.

5.5.1. The chromium tension

One case provides a deliberate test of the complementarity thesis rather than straightforward support for it. Chromium, processed domestically into ferrochrome, is arguably Türkiye's strongest demonstrated midstream capability — one of the few minerals it transforms at commercial scale into an alloying input rather than exporting unprocessed. Yet chromium appears on neither the EU's critical nor strategic raw-material list: it was designated critical on the EU's 2014 list but was removed at the 2017 review and is absent from the 2023 lists. The implication is clear: the stage at which Türkiye is most capable corresponds to a material the EU's current framework does not classify as critical or strategic — even though the EU continues to consume it heavily, chiefly in stainless steel.

The chromium case clarifies two analytical points. It shows that designation overlap — which minerals two jurisdictions jointly list — and capability alignment — which a state can actually process — are distinct dimensions of supply-chain positioning and need not coincide. It also indicates that prospective midstream complementarity depends on the intersection of designation overlap and industrial capability rather than on either alone: Türkiye's intermediary role should rest on those minerals in Table 3 where EU designation and demonstrated Turkish capability overlap — notably the shared-list base and metallurgical materials such as copper and aluminium, and boron-based industrial processing — rather than on chromium, whose capability is real but whose EU-facing criticality is, on the current list, absent. Chromium is examined separately because it is Türkiye's strongest demonstrated capability and therefore the most demanding test of the paper's argument; it illustrates latent metallurgical competence and the limits of list-based overlap, not a load-bearing example of EU-facing complementarity.

5.5.2. Summary

Viewed against the value-chain ladder, Türkiye's position concentrates in base and metallurgical processing (chromium/ferrochrome, copper and aluminium smelting, boron chemicals) and remains pre-commercial in the high-difficulty battery-chemistry and rare-earth-separation segment (lithium ~10 t/y pilot, rare earths ~1200 t/y ore pilot, no identified cobalt-refining or battery-graphite capability). Türkiye's credible near-term contribution therefore lies in selective base-metal and industrial-mineral processing, not the battery-grade and separated-rare-earth segments where EU dependence on China is most acute and Turkish capability least developed.

5.6. Structural constraints on Türkiye's midstream development

The preceding sections set out the industrial, energy, diplomatic and regulatory foundations of Türkiye's midstream role. A balanced assessment requires that these enabling conditions be weighed against the

Table 3
Mineral-specific assessment of Türkiye's realised midstream processing capability and principal constraints.

Mineral/group	Türkiye capability tier	Value-chain stage reached (per available sources)	Evidence base	Key constraint
Chromium (ferrochrome)	Strong	Smelting/alloying — ferrochrome, beyond ore export	Major chromite producer; commercial ferrochrome smelting by Eti Krom.	Not on the EU's current critical or strategic raw-material lists (removed after the 2017 assessment); strong capability but no EU criticality pull (§5.5.1).
Boron & borates	Strong	Refined boron chemicals/ industrial-minerals processing	Largest share of global boron reserves, held by state producer Eti Maden, and ≈60% of the ~4 Mt global boron market (2.6 Mt; MENR, 2024b); mature industrial-minerals base.	Türkiye's share of world boron reserves is commonly cited at ~70–73% (73% per Eti Maden/MENR); USGS (2026) lists Türkiye's reserves at 950 Mt without reporting a world total, so the precise share depends on the denominator used.
Copper	Moderate	Ore + early processing; partial smelting base present	Domestic copper mining and existing smelting, but >50% of refined demand imported (net deficit ≈ USD 1.6 bn, 2024; IICEC, 2025).	Refined-copper self-sufficiency not reached; Africa-feedstock link to EU not demonstrated.
Zinc	Weak — upstream only	Ore + concentrate; no industrial-scale smelting	Domestic ore, mostly exported as concentrate; cumulative trade deficit ≈ USD 4 bn since 2011 (Turunc, 2023).	Industrial-scale smelting absent.
Aluminium (bauxite chain)	Moderate	Smelting base present, operated by Eti Alüminyum	Established aluminium smelting by Eti Alüminyum; top-tier Turkish critical mineral and EU strategic raw material.	Downstream processing into higher-value intermediate products not documented.
Lithium	Weak/pilot	Pilot recovery only — ~10 t/ y from boron by-product	Eti Maden Eskişehir pilot launched 2020, reported ~10 t/y from boron by-product (Anadolu Agency, 2020); lithium net-import deficit ~ USD 1.3 bn, 2024 (IICEC, 2025).	Commercial lithium-chemical refining absent.
Rare earth elements	Weak/pilot	Pilot oxide production — Beylikova, ~1200 t/y ore	Beylikova pilot producing seven rare-earth oxides (Anadolu Agency, 2023).	Reported 694 Mt is total ore including barite and fluorite, not REO content (~12.5 Mt) (Anadolu Agency, 2022; Bloomberg HT, 2025); JORC certification pending; commercial separation absent.
Cobalt	Weak	Limited nickel–cobalt mining only (IICEC, 2025); no commercial cobalt refining identified	Designated 'important' by Türkiye; hydrometallurgical refining is distinct from existing smelting (§4.6).	Hydrometallurgical refining capacity absent; no public stage-level data located.
Battery-grade graphite	Weak	No documented anode-grade processing	Graphite designated critical by both the EU and Türkiye; no Turkish processing capability located.	Anode-grade processing absent; no public stage-level data located.

Note: Capability tiers — Strong = commercial-scale processing beyond ore/concentrate; Moderate = industrial processing present but with import dependence or an incomplete value chain; Weak/Pilot = pilot-scale processing or no commercial refining. Where no governmental or industry source establishing a value-chain stage was located, the constraint is recorded as 'no public stage-level data located'.

structural constraints that will determine whether that role can be realised. The following constraints do not preclude that role; rather, they define the conditions under which Türkiye could function as a selective midstream intermediary and qualify the energy and industrial advantages described earlier as relative rather than settled.

5.6.1. CBAM: opportunity and burden

The EU's Carbon Border Adjustment Mechanism (CBAM), established by Regulation (EU) 2023/956 and amended by Regulation (EU) 2025/2083 (European Union, 2023), is now a live cost. After a transitional reporting phase (October 2023–December 2025), CBAM entered its definitive phase on 1 January 2026, requiring authorised importers to report verified embedded emissions and surrender certificates priced to the EU Emissions Trading System (ETS); the first annual declaration and certificate surrender fall due in 2027, phasing in fully by 2034 as ETS free allocation is withdrawn. It currently covers six sectors — cement, iron and steel, aluminium, fertilisers, electricity and hydrogen — plus selected precursors, and does not yet reach most critical-raw-material refining stages.

This scope cuts both ways, in a way the earlier treatment of CBAM as an alignment incentive misses. The materials CBAM taxes at the border — steel, aluminium and cement — are precisely the energy-intensive metallurgical industries identified in Section 5.2 as Türkiye's midstream foundation. CBAM is therefore simultaneously an opportunity, advantaging proximate lower-carbon suppliers over distant high-carbon ones, and a burden, imposing carbon-cost and verification obligations on the very sectors that form Türkiye's processing base.

Türkiye's steel sector illustrates this duality. Unlike most major producers, which rely on coal-based blast-furnace–basic-oxygen-furnace (BF-BOF) routes, Turkish industry is largely scrap-fed electric-arc-furnace (EAF) based. Of 36.9 million tonnes of crude steel in 2024, EAF accounted for ~25.8 Mt and BOF for ~11.1 Mt — a ~70% EAF share, far above the EU (44.4%) and global (29.1%) averages (World Steel Association, 2025). This gives Turkish steel a structurally lower carbon intensity — a relative CBAM advantage. The advantage is conditional, however: because EAF emissions are dominated by electricity use (Scope 2), the CBAM-relevant footprint depends on the carbon intensity of the Turkish grid, which (Section 5.3) still draws substantially on fossil fuels (coal and gas) and remains around 400 gCO_2/kWh — well above the EU average (Ember, 2025). Maintaining this advantage requires continued grid decarbonisation; electricity-intensive primary aluminium is correspondingly more exposed than steel.

The implication is direct: future critical-mineral refining in Türkiye — itself energy-intensive — would have to compete not only on logistics and processing cost but also on carbon intensity and traceability, especially if CBAM's scope later widens down the metallic value chain, as is under EU discussion. Türkiye's CBAM readiness is thus partial, and its energy infrastructure is a relative advantage rather than a completed competitive edge.

5.6.2. Natural-gas import dependence and energy-price exposure

Although Türkiye's gas supply is well diversified across suppliers (Section 5.3) — which buffers it against single-source disruption — it still imports the overwhelming majority of its gas (52.2 billion m^3 in 2024, from Russia, Azerbaijan and Iran by pipeline, the remainder as LNG). This import dependence continues to transmit price volatility and exchange-rate pressure into industrial energy costs. Because lithium, rare-earth and cobalt refining are highly energy-intensive, Türkiye's refining ambitions remain exposed to external energy-price shocks despite growing renewable capacity; energy security is thus a relative advantage over many African producers, not an absolute edge.

5.6.3. The Akkuyu dimension and Russian dependence

The Akkuyu nuclear plant (4.8 GW; Section 5.3) is designed to provide stable baseload power suited to continuous refining, but its strategic implications are more complex from an EU perspective. Built and operated by the Russian state corporation Rosatom, with fuel-cycle services tied to Russian supply, Akkuyu strengthens the reliability of electricity for energy-intensive industry while embedding long-term dependence on Russian technology, nuclear fuel and operational support. This issue matters because Türkiye's prospective value to the EU rests partly on reducing, rather than relocating, strategic dependencies. Akkuyu therefore qualifies — without negating — the argument that Türkiye's energy infrastructure strengthens its attractiveness as a prospective midstream refining location.

5.6.4. Exchange-rate volatility and macroeconomic risk

Critical-mineral refining is capital-intensive — high upfront expenditure, long payback, frequent reliance on foreign financing — which contrasts with Türkiye's recent environment of elevated inflation, currency volatility and high financing costs. Exchange-rate instability may raise investment risk and the cost of capital for large refining projects, slowing commercial scale-up even where the industrial logic is sound (IMF, 2026). This constraint matters because the midstream thesis depends on new capacity being financed and built, not merely on latent capability.

5.6.5. The technology gap

As Sections 5.2 and 5.5 establish, Türkiye's metallurgical strengths do not translate automatically into competitive capability across the value chain: copper smelting is not lithium-chemical refining, steelmaking is not rare-earth separation, and conventional pyrometallurgy differs from the cobalt hydrometallurgy and solvent-extraction required for battery-grade and separated-rare-earth products. The existing base provides process-engineering competence, chemical supply, skilled labour and regulatory maturity, but the high-purity separation-and-chemicals segment remains demonstrated only at pilot scale; closing the gap depends on sustained investment, technology partnerships and workforce development. The partnership channel itself qualifies the diversification value of prospective capability: Ankara signed a mining-cooperation memorandum with Beijing in October 2024 aimed at joint work on critical minerals in Türkiye, so early rare-earth processing capability may arrive partly through Chinese technology (BBC News Türkçe, 2025).

5.6.6. Environmental governance and permitting

New refining facilities are subject to environmental impact assessment, water-use and waste-management requirements, and local acceptance processes that can affect timelines and costs, and that interact with the EU's own sustainability and due-diligence expectations for partner-based processing under the CRMA. For a prospective intermediary whose appeal rests partly on environmental, social and governance compatibility, permitting and environmental governance are part of Türkiye's competitiveness, not peripheral.

5.6.7. Overall assessment

These constraints do not invalidate Türkiye's prospective midstream role; they indicate that its emergence depends on sustained technological upgrading, regulatory adaptation, low-carbon industrial transformation and macroeconomic stability. Türkiye's comparative advantage is therefore relative rather than automatic — reinforcing the paper's bounded claim that Türkiye is a prospective midstream intermediary whose realisation is conditional, not an established midstream power.

6. Strategic implications of a prospective midstream role

6.1. EU strategic autonomy at the intersection of industrial and defence supply chains

The implications discussed below follow conditionally from the enabling conditions identified in Sections 3–5 and should be read as prospective rather than predictive. The designation overlap identified in Section 3 also has implications for the EU's pursuit of strategic autonomy, which increasingly depends on securing, refining and governing critical intermediate materials. The International Institute for Strategic Studies notes European defence dependence on external suppliers for materials such as gallium, tungsten and titanium (IISS, 2025).

Türkiye's industrial and metallurgical base offers a practical pathway for diversification. If refining develops at commercial scale, production in Türkiye could distribute supply risk across African–European corridors while reducing reliance on concentrated Chinese refining.

This industrial logic also has a security dimension: Türkiye's NATO membership provides an institutional foundation within the transatlantic defence-industrial architecture, one that could make prospective Turkish refining and alloying comparatively lower-risk in scenarios of EU–China or US–China tension. Türkiye's participation in US-led initiatives extends this alignment. As a participant in the Minerals Security Partnership (MSP) Forum — alongside the EU, US and other G7 and Indo-Pacific partners — it participates in efforts to strengthen supply chains for materials central to clean-energy and defence technologies (U.S. Department of State, 2024). Within the MSP Forum, which also includes producer states such as the DRC, Namibia and Uzbekistan, Türkiye's participation provides an institutional platform through which producer–consumer linkages could develop.

This EU–NATO–MSP convergence provides an institutional framework within which Türkiye could emerge as a transatlantic midstream partner, aligning with NATO's 2024 Defence-Critical Raw Materials List (NATO, 2024). Because defence and aerospace systems depend on certified, performance-grade materials rather than unprocessed ores, processing these intermediate stages is central to strategic autonomy. By maintaining EU regulatory compatibility, contributing to NATO's agenda and engaging within the MSP, Türkiye could play a multi-layered role in transatlantic mineral security. These memberships are enabling alignments, not automatic guarantees of trust or supply-chain reliability.

6.2. Implications for Africa's bargaining power

Rising critical-mineral demand expands opportunities for African economies but widens the imbalance in value capture. China's refining dominance has created a highly concentrated purchasing environment in which African exporters have limited leverage over pricing, technology transfer and partnership terms. Türkiye's prospective emergence as an additional refining node could partially mitigate this through competitive intermediation, giving African producers more flexibility in routing, contracts and downstream engagement through refining capacity operating under EU-compatible standards.

This does not resolve Africa's structural constraints. Capital scarcity, infrastructure gaps and institutional fragilities continue to limit large-scale domestic beneficiation (AfDB, 2018), and Türkiye's own refining remains early-stage; Turkish refining therefore complements rather than replaces Chinese refining. Even incremental diversification, however, broadens African negotiating space, reducing dependence on a single buyer and aligning with the Africa Mining Vision's emphasis on gradual, partnership-based upgrading.

6.3. Implications for China's midstream dominance

Any future expansion of Turkish refining capacity would represent a strategic adjustment rather than a structural challenge to China's dominance: China's advantages in scale, vertical integration and state-backed technology remain decisive, and Turkish capacity would capture only a limited share of global refining. Even limited diversification could have broader strategic effects: the emergence of viable alternative hubs would show that midstream intermediation is not inherently confined to China, strengthening Western resilience and reducing exposure to export controls. One plausible response would combine competition and accommodation — deepening African upstream investment while selectively partnering with Turkish or European firms to retain influence.

Together, these implications reinforce the paper's central claim: if the industrial, regulatory and commercial conditions identified earlier are met, midstream capability can become a source of strategic influence for middle powers without dominance in extraction or manufacturing. Türkiye's significance would then lie not in scale or in replacing established refining powers, but in expanding the range of intermediary options available to Europe and African producers — a contribution of diversification rather than dominance.

7. Conclusion

This article examined critical-mineral geopolitics from a midstream perspective, focusing on the refining stage rather than extraction or end use. It conceptualises midstream power as positional capacity within global value chains, rather than dominance based on resource ownership or manufacturing scale, and highlights the role of industrial intermediation and network governance in the energy transition. The article is, accordingly, a conceptual policy analysis of enabling conditions and institutional prerequisites, not an empirical demonstration of an operational corridor.

Applied to the Africa–Europe corridor, the framework identifies Türkiye as a prospective intermediary linking African production with European demand, whose relevance derives not from mineral abundance but from the convergence of industrial capability, geographic centrality, logistics, diplomatic connectivity and regulatory alignment. The overlap analysis shows that Türkiye designates 63.6% of the EU's critical and 82.4% of its strategic raw materials reflects a shared assessment of supply risk and priorities. Such overlap is not, in itself, sufficient for intermediation, but it can lower transaction costs and create a common prioritisation framework on which cooperation can build. Türkiye can therefore be understood as a midstream node that could, under the conditions identified above, aggregate, transform and route mineral flows — a prospective rather than demonstrated capability.

The article makes two main contributions. Theoretically, it extends middle-power scholarship by showing how industrial capability and value-chain coordination can generate geopolitical influence without control over resource extraction or manufacturing. Unlike extractive or coercive models, midstream power links geographic position with industrial capability, adding a supply-chain dimension to debates on geoeconomics, energy geopolitics and strategic autonomy. Methodologically, it offers a transparent, reproducible framework for comparing national critical-mineral designation systems, showing how coding choices shape the resulting measures of designation overlap.

For the EU, Türkiye is a proximate partner experienced in serving EU-facing markets that can support diversification and resilience under the CRMA without full onshoring of refining. For African producers, intermediary refining channels embedded in EU-facing regulatory frameworks could offer an incremental path to stronger bargaining power, diversified partnerships and gradual value retention, consistent with the Africa Mining Vision. For Türkiye, selective midstream investment offers industrial upgrading, reduced trade deficits and deeper integration into European and transatlantic mineral-security frameworks.

The analysis indicates that Türkiye can function as a prospective midstream intermediary only if commercial refining capacity expands alongside continued regulatory alignment with the EU, sustained industrial investment and mutually beneficial partnerships with African producers. Its prospective role is therefore one of mediation, not displacement: its comparative advantage lies in coordination rather than scale — connecting African resource flows, European demand and transatlantic security architectures within an increasingly fragmented mineral economy. This shows how connectivity, regulatory translation and industrial intermediation can generate strategic relevance even without dominant production capacity.

The analysis establishes plausibility rather than sufficiency: it shows that Türkiye possesses several enabling conditions for selective intermediation, not that these conditions are jointly sufficient or that Türkiye is the strongest candidate among prospective intermediaries — a comparative question the framework is designed to support. Future research could extend the midstream-power framework to comparative cases such as Japan, Indonesia, Malaysia or Chile, examining how institutional, industrial and geopolitical contexts shape intermediary influence. It could also address the financial, technological and governance mechanisms required to scale midstream capacity, and their distributive consequences for producer regions. As critical-mineral supply chains become increasingly regionalised and strategically contested, the capacity to refine, coordinate and connect value chains is likely to become as important as ownership of the resources themselves in shaping geopolitical influence.

Declaration of competing interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.resourpol.2026.106042.

Data availability

All data are drawn from publicly available documents cited in the article (Regulation (EU) 2024/1252; MENR, 2025; IEA; USGS). The full coding is provided in Appendix A (supplementary material).

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