Critical raw materials, critical politics: Towards a proactive German raw materials strategy within the European Union

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Abstract

The article analyses Germany's raw materials policy in oligopolistic markets paired with significant geopolitical market power. The previously defensive, market-oriented approach creates structural vulnerability, as critical minerals are central to digitalisation, decarbonisation and the defence industry. The article argues for a strategic realignment within the European Union: 'market plus strategy' – with more robust instruments ranging from diversification, foreign investment and stockpiling to the circular economy, as well as some extent of demand-oriented regulation.

1 Motivation of the topic

The 2020 raw materials strategy of Germany is more ambitious than that of 2010, but remains market-based with an exclusive international orientation. Germany's industry depends on the supply by foreign countries for several raw materials (including rare earths, palladium, cobalt, nickel, copper and graphite); mining takes place partly in Africa, while processing and market policy conditioning often take place in China. Sanctions against Russia and Chinese export restrictions exacerbate the risks. The German energy transition project away from nuclear and carbon energy is temporarily increasing the need to import raw materials for green energy production and storage. Raw materials policy addresses domestic availability (subject to location policy) and international supply chains (subject to trade policy). Germany's approach is purely defensive: priority is given to market mechanisms of foreign trade, flanked by recycling, limited domestic production, partnerships and diversification. No significant weight is given to foreign direct investment into own controlled mining and refining capacities in research-rich countries.

2 Markets, Specialisation, Abuse of Market Power

In market logic, prices reflect shortages; in the case of homogeneous raw materials, price differences primarily reflect differences in (geo)poltical risk and costs due diverging mining and refining technologies. Foreign trade compensates for local unavailability and specialisation on comparative advantages leads to dependencies, whilst such dependencies do not grant undue power, as they remain reciprocal. In such a perspective, political intervention, let alone a strategy for raw materials would not be necessary. In reality, however, global raw material trade occurs on oligopolistic markets, plagued by dominance and abuse of market power against countries that have de-specialised completely from the production of raw materials.

3 Motivation for a Raw Materials Policy and Strategy

Critical raw materials have high economic relevance as production factors, substitution is typically limited in technical and cost terms (e.g. indium, tantalum, silicon), and are traded on markets with supply concentration. This is complemented by a slow supply response as another market failure: increasing supply in new mining projects can take 15-20 years from exploration to exploitation and refining, and that under considerable geological and geopolitical risks. Weak international enforcement (WTO Appellate Body blocked) encourages abuse of market power. In absence of supply for the own industry, production relocates to regions with better supply conditions, further aggravating dependencies on countries frequently abusing their dominance.

4 Transitioning from reliance on markets to geopolitical raw material power in practice

China's policy on rare earths (including export restrictions from 2010 to 2015 and renewed restrictions in 2025, partly also for products/technologies) has ‘weaponised’ its market dominance for economic as well as diplomatic purposes. Others, like Indonesia (for nickel) and Zimbabwe (for chromium) also restricted exports in order to promote domestic processing. Failure to respond creates competitive disadvantages; at the same time, retaliatory measures are costly for the economy as a whole. The rational policy would be to strengthen international enforcement institutions – which are currently limited in reality.

5 Net-Zero, Digitalisation, National Interests

As a result of the net-zero-project and digitalisation, demand for critical minerals is rising sharply (electric transportation, electrical & electronic equipment, batteries). Studies often

estimate insufficient infrastructure/supply: the IEA expects mineral requirements for renewable energies to increase many times over compared to today's levels. At the same time, national interests are growing among both raw material producers and major consumer countries; resource-rich developing countries are becoming more assertive. Nevertheless, the German paradigm remains defensive and is causing reluctance to invest (e.g. in the automotive industry) due to supply uncertainty, leading to de-industrialisation of the German industry.

6 Political Objectives and Conflicting Goals

Market participants minimise current costs considering only short-term risks, further uncertainties are not priced in at all. Precautionary strategies lead to competitive disadvantages and remain unachievable, if not compensation for by political intervention. Policies must therefore set targets amid uncertainty: between self-sufficiency (expensive, low risk) and cheap global supply (inexpensive, high risk) lie mixed strategies (long-term contracts, partnerships, foreign investments, diversification of supply). Germany is focusing on security of supply for the energy transition/high technologies (e.g. lithium, rare earths, nickel, cobalt) – turning a blind eye on geopolitical power projections. This may prove to be insufficient.

7 Instrument Check

- Contracts/partnerships: limited resilience, as national interests dominate in bottlenecks; useful, but not a robust crisis instrument. Diversification reduces dependencies (Japan as an example), but involves efficiency-cost at the user-level and has limited effectiveness in episodes of global supply shortages and crises.
- Development aid/cooperation: potentially a good match, but challenges prevail due to underdeveloped markets and institutional weaknesses: transparency, skilled workers and technology, infrastructure. Chinese models create dependency through infrastructure loans (debt-equity swaps, Angola-mode) – not a model for Germany.
- Foreign (direct) investment and economically active state: German companies are too small/too late; vulnerable without political backing (e.g. ACISA Bolivia). European pooling and state-own enterprises in mining and refining, possibly as public-private partnerships could increase resilience of supply and bargaining power in oligopolistic markets. EU law (Art. 107/101 TFEU) allows exceptions for aid/cooperation if competition/innovation/ security of supply are promoted.
- Deep sea/space: options with high potential, but environmental/legal uncertainties; EU is reluctant, while other countries forge ahead – risk of even more structural disadvantages in raw materials markets emerging.

- Domestic mining: sensible if risk premiums justify higher unit costs; opportunity costs can be reduced through technology/productivity, but depend on environmental, labour protection requirements and human rights.
- Circular economy: independence from geopolitical supply chains, currently not cost-competitive; useful as a long-term mitigation and technology pathway, less so for short-term bottlenecks.
- Stockpiling: minimal market distortion, internationally proven (Japan, South Korea); rarely used in Germany – lever for short-term resilience.
- Demand-side policy: Price signals, incentives and bans to reduce consumption; increased energy prices structurally reduce raw material/energy intensity.

8 European Alliance Instead of Going It Alone

The EU framework (e.g. Critical Raw Materials Act) sets targets for extraction, recycling and third-country dependencies, but remains defensive and somewhat inconsistent. What is needed is greater European sovereignty, a coordinated approach towards third countries, the use of exceptions from strict EU competition law (cartels, state aid), scaled public-private initiatives and a strategic reserve policy. Without European consolidation, Germany will remain vulnerable in oligopolistic markets.

9 Conclusions

In commodity markets with significant market power and its abuse, reliance on market mechanisms is not enough to secure resilience for domestic industry. Germany needs a proactive commodity strategy within the European Union: diversify, invest (domestically/abroad), build up reserves, scale up recycling, strengthen domestic production where productivity/technology support this, and strengthen international institutions – knowing that enforcement is currently weak. Short-term instruments (stockpiling, diplomacy) must be combined with long-term ones (capacity building, innovation, circular economy). Since power often counts for more than competitiveness at present, without strategic market supplementation, there is a risk of becoming a crisis candidate – including risks for the net-zero project.