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Management Summary – Rare Earths (Automotive Industry)

Executive Highlights (Key Facts)

- 90–96% of the global value chain for permanent magnets (NdFeB), which are indispensable for electric motors in vehicles, is located in China.
- Over 80% of the world's separation and refining capacity for rare earths is located in China.
- Germany and the EU are almost completely dependent on imports for heavy rare earths (e.g., dysprosium, terbium).
- An average electric vehicle contains 1–2 kg of rare earth magnets; an offshore wind turbine up to 600 kg.
- Chinese export controls on strategic raw materials have a direct impact on prices, availability, and production risks in the automotive industry.

Definition – Rare earths

Rare earth elements (REE) are a group of 17 chemical elements (15 lanthanides plus scandium and yttrium). They are key raw materials for high-tech applications, especially for permanent magnets in electric motors, power electronics, sensor technology, battery technology, wind turbines, and defense and aerospace technology. Although they are not rare geologically, they usually occur only in low concentrations and are technically, energetically, and ecologically costly to extract and process.

Key message

The global supply of rare earths is determined less by the amount of deposits than by geopolitical dependencies, processing capacities, and trade flows. Germany has no significant domestic production or separation capacity and is therefore structurally dependent on imports.

Global overview – deposits, production, and consumer countries

Country	Reserves (million tons REO)	Production in 2024 (t REO)	Major consumer countries (imports)
China	44	270,000	China, Japan, USA, South Korea, EU
Brazil	21	~20	China, potentially USA/EU/Japan
India	6.9	~2,900	Vietnam, Japan, China, EU
Australia	5.7	213,000	Japan, Malaysia, USA, EU
Russia	3.8	~2,500	EU, China, Turkey
Vietnam	3.5	~300	China, Japan, South Korea
USA	1.9	45,000	China, Vietnam, South Korea, USA
Greenland	1.5	-	USA, EU (in future)
Tanzania	0.89	-	China, prospectively EU/USA
South Africa	0.86	-	USA, UK, Australia, Turkey

Risk assessment from a German perspective – focus on the automotive industry

The German automotive industry is particularly dependent on rare earths, especially neodymium, praseodymium, dysprosium, and terbium. These materials are essential for electric motors, steering systems, actuators, sensors, and driver assistance systems.

Key risks:

- High dependence on imports without sovereignty over raw materials or processing
- High concentration risk due to Chinese separation and magnet production
- Vulnerability to geopolitical tensions, export controls, and trade conflicts
- Price volatility and limited substitutability
- Structurally increasing demand due to electromobility and automation

Implications for OEMs and suppliers:

Rare earths are a strategic production and competitive risk. Hedging requires long-term purchase agreements, supplier diversification, early material substitution (where possible), and active participation in European raw material and processing initiatives.

Sources (total)

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