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The Concentration Problem: What Actually Reduces Magnet Supply Risk

Processing and sintering capacity is concentrated enough that a single disruption reaches every downstream buyer at once. Here is where the exposure actually sits, and what genuinely reduces it — as distinct from what merely feels like doing something about it.

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The rare-earth magnet supply chain has one structural feature that dominates every other risk factor: a large majority of NdPr oxide separation and of NdFeB sintering capacity sits inside one processing ecosystem. Mining is more distributed than people assume — Australia, the United States and China all produce rare-earth concentrate. What is concentrated is the step in between: turning ore into separated oxide, and oxide into sintered magnet. That is where the exposure actually lives, and it is worth being precise about it, because most of what gets proposed as a response does not touch it.

What does not reduce the exposure

Diversifying where you buy finished magnets from does very little if every supplier is sourcing sintered blocks from the same handful of processing facilities. A second name on the purchase order is not a second source if the material behind it traces back to the same choke point. This is the single most common mistake in supply-risk planning: treating supplier count as a proxy for resilience, when the thing that matters is where the processing actually happens.

Holding larger inventory buys time, not resilience. It converts a supply shock into a delayed supply shock. Useful for riding out a short disruption; it does nothing for a structural one.

What does

A genuinely qualified second source. Not a second name — a second source whose material you have tested yourself, at your own operating temperature, with your own thermal ageing data. See our reference entry on qualification for what that actually involves; it takes six to twelve months done properly, which is the argument for starting now rather than when you need it.

Grade flexibility. If your design can only accept one specific grade from one specific supplier, you have no room to manoeuvre when that supplier has a bad quarter. Understanding your real operating point — not the datasheet number, the actual permeance coefficient your circuit runs at — often reveals more flexibility than the original specification assumed.

A tested recycling or short-loop route. Not identified — tested. Adamas Intelligence projects roughly 45,000 tonnes a year of end-of-life NdFeB entering the waste stream from consumer electronics alone by 2035, and short-loop recovery from production scrap already runs at 95%+ recovery in commercial facilities. If recycled content becomes a customer requirement — and EU and US policy is moving that way — the company that tested a route in 2026 is answering a question in 2028 that competitors are still investigating.

Honest visibility into tier-2 exposure. Most companies that believe they are diversified are buying finished motors or assemblies from suppliers who are themselves single-sourced on the magnet. The exposure is real; it is just one layer removed from where anyone is looking.

On price, since it is usually the first question

NdPr oxide moved from a 2021 peak near \$175/kg to a 2023 trough near \$48/kg, settling around \$65–80/kg through 2024–25 — roughly a threefold range inside four years. That volatility is the reason grade flexibility and a tested second source matter more than any financial hedge: the practical response to a price shock is almost never financial, it is engineering optionality that already exists before you need it.

The instructive precedent

Japan's response after 2010, when China briefly restricted rare-earth exports to Japan, remains the clearest worked example. The response was not diversifying suppliers — it was recycling, substitution research, and joint development between NIMS and industry that reduced import dependency from roughly 83% over the following years, without giving up motor performance. It took sustained investment rather than a single decision, and it started from exactly the position most companies are in today: aware of the exposure, without yet having done anything that changes it.

The practical takeaway is the same at any scale. Concentration risk is not solved by a procurement announcement. It is solved by three unglamorous things done properly: a second source you have actually tested, grade flexibility you have actually engineered, and a recycling route you have actually validated. Everything else is managing the symptom.

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Discuss this against your own supply chain

For more detail, or to put your own numbers against this, contact Dr Raghavan Gopalan or Srinivasan Gopalan at info@twinpolepartners.com.