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Australia Materials | Asia Pacific

Takeaways from Rare Earth Permanent Magnet Industry Discussion

MORGAN STANLEY AUSTRALIA LIMITED+

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AUSTRALIA MATERIALS	
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Industry View	Attractive

We hosted a discussion with an expert with ~35 years in the rare earth permanent magnet industry, focussing on the build-out of ex-China magnet capacity, rare earth intensity reduction, China-related supply risk, rare earth substitution risk, and implications for NdPr, Dy and Tb demand.

Key Takeaways

- Ex-China NdFeB capacity is scaling: US ~28ktpa by 2028, Europe ~3.6ktpa and Japan ~6.8ktpa+ from established producers.
- Sees US capacity in 2028 more than covering current NdFeB imports (~8.5ktpa) if executed, but qualification, metal/alloy supply and cost will decide output.
- NdPr substitution remains difficult; total rare earth content in NdFeB only fell from ~32% to ~30.5% over two decades.
- Dy/Tb use has fallen much more materially, with HREE demand reduced by 50%+ in some applications through Grain Boundary Engineering and design changes.
- Sees China's rare earth controls as a national security issue given military use. Although defence demand may be <500tpa this complicates commercial approvals.

Ex-China rare earth magnet capacity is growing: The expert expects that US Neodymium Iron Boron (NdFeB) capacity could reach ~28ktpa by 2028, based on announced projects and expansion from proven US manufacturers, including MP Materials (*covered by Carlos De Alba*), e-VAC / Vacuumschmelze and Noveon Magnetics (not covered), with broader potential US capacity of ~35ktpa when including funded and potential projects, and potential growth to ~50-55ktpa beyond 2028. This compares with current US bulk magnet imports of ~8.5ktpa from China, Vietnam and Europe, suggesting that, if executed, announced US capacity could more than sufficiently cover current US usage. However, customer qualification, metal/alloy availability, yield, process control and cost competitiveness remain challenges and will determine utilisation.

Western bottlenecks sit in metal/alloy supply and process control: The expert highlighted oxide-to-metal conversion and strip-cast alloy production as key missing links in the US supply chain. Magnet manufacturing also requires process control, automation, QA systems, trained labour, and customer qualification. For experienced companies, the expert estimated ~3 years from factory design to full output; for start-ups, the timeline could be closer to ~6 years.

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NdFeB intensity reduction is mainly about HREEs, not total rare earth content: Total rare earth content in NdFeB magnets has only declined modestly over the past two decades, according to the expert, from ~32% to ~30.5%. Most of the improvement has come from reducing Dysprosium (Dy) and Terbium (Tb) use, where grain boundary diffusion, grain boundary engineering, smaller grain size, and lower application temperatures have cut heavy earth rare element (HREE) demand by 50% or more in some applications.

NdPr substitution looks more limited: The expert framed Neodymium-Praseodymium (NdPr) as more structurally embedded in NdFeB magnet chemistry. Pr substitution has helped broaden usable supply, while Ce/La-substituted grades have grown into a lower-cost product family. However, these grades fill a performance gap between NdFeB and lower-performance magnets, such as ferrite and alnico, rather than replacing high-performance NdFeB.

Rare-earth-free magnets remain application-specific: The expert does not expect a broad shift away from NdFeB. Ferrite, alnico and iron-nitride serve selected applications, but NdFeB retains a strong price-performance position. Iron-nitride is still under development and appears more relevant for lower-temperature applications. The more likely outcome is differing growth rates across magnet types and motor technologies, rather than broad displacement of NdFeB.

For wind generation, substitution depends on capital cost, maintenance and turbine architecture: The expert noted that wind generation began with induction systems and has also trialled ferrite magnets. In the West, induction systems can still be commercially attractive. NdFeB permanent magnet generators carry higher upfront cost but can reduce maintenance costs, with permanent magnet systems operating at lower speeds and potentially eliminating or simplifying the gearbox. The expert estimated NdFeB magnets in a wind generator can represent ~4–5% of total system cost, vs. ~2–2.5% for older induction-based systems. In the US, only ~1–2% of installed wind power generators uses NdFeB magnets, Europe is somewhat higher, while China may be 30-50%, or more.

China controls are already changing OEM sourcing behaviour: The expert viewed China's rare earths related export controls as partly aimed at protecting its industry position, alongside geopolitical considerations. China exports magnets directly and embedded in finished products, such as appliances, fans and other equipment, making controls commercially and politically sensitive, according to the expert. Customers are already moving toward non-China producers for immediate supply and approval processes, the expert said. Western defence industry demand for NdFeB magnets is small, potentially <500tpa, but often intermingles with commercial and industrial applications, which can complicate approvals.

Military and high-temperature applications remain sensitive: The expert highlighted aircraft generators, sensors and non-critical motors as areas where rare earth magnets are used, including Samarium-Cobalt (SmCo) and NdFeB. SmCo remains relevant in elevated-temperature and demanding aerospace / defence applications, while NdFeB is used more broadly where high magnetic performance is required. This makes end-use sensitivity important under dual-use controls.

China pricing has pressured Western production: China-made magnets have historically been priced well below US, Japanese and European levels. In the expert's view, Chinese suppliers were often competing with each other for market access and share, rather than only competing against Western producers. In the early 2000s, Chinese pricing was around 75% of US selling prices, which made Western production difficult, particularly when US producers were already close to break-even. A competitive Western industry therefore requires a manufacturing cost base that can support viable pricing.

Western producers can close the quality gap faster than the cost gap: The expert argued that Western producers could reach Chinese magnet quality within about three years, but are unlikely to reach Chinese low production costs in the near term. China's advantage reflects lower costs across many manufacturing stages and decades of process learning. The expert estimated domestic NdFeB magnets may be ~50% more expensive than China-sourced magnets.

End-market demand is nuanced: US wind demand for permanent magnets remains limited, given low offshore wind activity and minimal permanent magnet use in onshore wind. In EVs, the expert cited NdFeB magnet weight at ~12g/kW of rated motor power, or slightly above 2kg per battery electric light-duty vehicle, while hybrids use roughly half the magnet weight. Emerging areas such as mobile robots may add demand, but many applications use very small magnets, which may be attractive on a $/gram basis without requiring thousands of tonnes of magnet output.

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	Coverage Universe		Investment Banking Clients (IBC)			Other Material Investment Services Clients (MISC)	
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1542	42%	465	51%	30%	707	43%
Equal-weight/Hold	1571	43%	369	40%	23%	723	44%
Not-Rated/Hold	3	0%	0	0%	0%	1	0%
Underweight/Sell	551	15%	86	9%	16%	201	12%
Total	3,667		920			1632	

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BHP Group Ltd (BHPB.L)	O (09/19/2024)	3,238p
BHP Group Ltd (BHGJ.J)	O (09/19/2024)	ZAc 70,399
BHP Group Ltd (BHP.AX)	O (09/19/2024)	A$60.34
Boss Energy Ltd (BOE.AX)	O (01/16/2026)	A$1.16
Deterra Royalties Ltd (DRR.AX)	O (01/16/2026)	A$4.53
Fortescue Metals Group Ltd. (FMG.AX)	U (01/16/2026)	A$19.60
IGO Ltd (IGO.AX)	U (07/15/2025)	A$7.94
Iluka Resources Ltd (ILU.AX)	O (05/22/2025)	A$8.13
Lynas Rare Earths (LYC.AX)	E (04/14/2026)	A$18.62
Mineral Resources Limited (MIN.AX)	++	A$66.63
Paladin Energy Ltd (PDN.AX)	O (10/08/2025)	A$9.83
PLS Group Ltd (PLS.AX)	E (04/14/2026)	A$5.53
Rio Tinto Limited (RIO.AX)	E (04/09/2025)	A$175.99
Sandfire Resources Ltd (SFR.AX)	U (12/16/2024)	A$20.71
South32 Ltd (S32.AX)	O (12/16/2024)	A$4.15
South32 Ltd (S32J.J)	O (12/16/2024)	ZAc 4,876
Whitehaven Coal Ltd (WHC.AX)	O (04/14/2026)	A$8.27
Shannon J Sinha		
Nickel Industries (NIC.AX)	E (04/09/2025)	A$0.96

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