The Rare Earth Feedstock Problem

written by Jack Lifton | November 24, 2026

“When I hear the next mine-to-magnet announcement, I will ask for the name of the plant that will make the metal, the specification it will meet, and the date it can fill the first repeat order.” — Jack Lifton, Co-Founder & Co-Chair, Critical Minerals Institute (CMI).

If I were financing a rare earth permanent magnet plant, my first question would be where it will get its alloy. I would then work backward. Who will make the alloy, who will supply the metal, and which plant will separate the oxides that the metal producer can use? I would want names, specifications, quantities, and delivery dates. A mine can have excellent geology and a reliable concentrator, and the magnet plant can still spend its first year looking for feedstock.

InvestorNews Data Note: General Motors Company (NYSE: GM) paid MP Materials Corp. (NYSE: MP) US$150 million in advance for NdPr metal. At September 30, 2026, MP still owed GM US$27.6 million of metal under the agreement. On November 5, MP’s chief executive said the company had completed GM’s qualification process, “with saleable magnet deliveries and revenue beginning in the fourth quarter.”

A mineral concentrate is the feedstock for a chemical plant. It has to be cracked or leached, its impurities removed, and its rare earths separated into individual high-purity oxides or a controlled blend such as neodymium-praseodymium, or NdPr. The oxide then becomes feedstock for a different business: metallization. In the traditional (legacy) routes, it must first be converted into a suitable fluoride. The resulting metal, or

in some cases an intermediate alloy, then has to meet the magnet maker's specifications. Every plant along that chain needs a product the next plant can use. Counting metric tons on a rare earth oxide-equivalent basis at the mine tells us how much rare earth the material contains. It gives us no delivery schedule for separated oxide, metal, or alloy.

The chemistry determines what equipment we need. Molten salt electrolysis is the principal industrial route for neodymium, praseodymium, and NdPr metal. High-purity terbium and samarium metal are commonly made by reducing their fluorides with calcium. Dysprosium–iron alloy can also be made electrolytically with a (sacrificial) iron cathode. Samarium presents a different problem. Its high vapor pressure makes it suitable for reduction and vacuum distillation, commonly using lanthanum as the reductant. Samarium goes into samarium–cobalt magnets. Terbium and dysprosium go into certain NdFeB grades, where they help the magnets resist demagnetization at elevated temperatures. A supply chain serving both families needs access to both electrolysis and metallothermic reduction. The plants can be in different places. They need contracts and products that fit together.

China's advantage grows as the material moves downstream. The International Energy Agency (IEA) puts China's 2024 shares at about 60 percent of mined magnet rare earths, 91 percent of refined output and 94 percent of sintered permanent magnet production. The International Monetary Fund (IMF) cites estimates of 93 percent of light rare earth metal refining and 95 percent of heavy rare earth metal refining. Those figures have different denominators. The one I would most like to see is how much qualified NdPr metal, dysprosium or terbium metal or alloy, and samarium metal a buyer can actually obtain outside China, month after month. Published capacity figures rarely answer that question.

InvestorNews Data Note: The International Energy Agency estimates that in 2005 China accounted for “around 50% of the production of sintered permanent magnets” worldwide. By 2024, China’s share had reached 94%. Further upstream, the International Monetary Fund puts China’s share of oxide separation at 88% for light rare earths and 97% for heavy rare earths.

A base already exists. Japan’s Santoku Corporation lists NdPr metal and dysprosium–iron alloy. MP Materials Corp. (NYSE: MP | Frankfurt: 55H0) states that it has begun commercial metal production in Texas. Less Common Metals Limited, a subsidiary of USA Rare Earth, Inc. (NASDAQ: USAR), operates in Britain, and Energy Fuels Inc. (NYSE American: UUUU | TSX: EFR | ASX: EF2 | Frankfurt: V051) reports about 1,300 metric tons a year of installed NdFeB alloy capacity at its Korean Metals Plant. That last figure is alloy nameplate capacity, measured in metric tons and including iron and boron. In July, Evolution Metals & Technologies Corp. (NASDAQ: EMAT) reported a first five-metric-ton NdPr metal delivery from SRE Vietnam Co., Ltd. In November, Aclara Resources Inc. (TSX: ARA | OTCID: ARAAF) reported 767 kilograms of NdPr metal produced to date at its Chilean demonstration plant, with customer qualification trials still ahead. A shipment, a demonstration campaign and a capacity rating each tell us something different. Only a series of accepted shipments tells a buyer what it can put into its production schedule.

InvestorNews Data Note: On July 22, Evolution Metals & Technologies Corp. (NASDAQ: EMAT) announced a first delivery of five metric tons of NdPr metal. Its subsequent quarterly filing records four metric tons received at the plant after the trial lot cleared Korean customs. Three further shipments totaling 36 metric tons, invoiced at US$5.4 million, arrived at Korean ports between September 11 and October 10. Evolution said it lacked the working capital to make the required payments and that the cargo remained “uncleared in bonded port storage.”

Can non-Chinese producers supply the non-Chinese world in the next two or three years? I think they can supply more and secure some particularly important customers. I see very little prospect of replacing Chinese supply across the market by 2029, especially for the full range of heavy rare earth inputs and qualified alloys. The IEA's 2026 assessment puts announced 2035 capacity outside China at roughly 50,000 metric tons of contained magnet rare earths at the mine stage, under 40,000 at refining and separation, and about 18,000 in downstream projects covering metals, alloys and magnets. All three figures are on a rare earth content basis. The last is a project pipeline figure, and the comparison covers Nd, Pr, Dy and Tb. Samarium has to be assessed separately. What strikes me is how much of the proposed mine capacity has no corresponding downstream capacity in that comparison, even on a 2035 horizon.

InvestorNews Data Note: The International Energy Agency estimates that downstream projects announced outside China by early 2026 could produce the equivalent of 57,000 metric tons of neodymium-iron-boron material in 2035. The neodymium, praseodymium, dysprosium and terbium in that material would weigh about 18,000 metric tons, or roughly 32% of the total. On that rare earth content basis, the agency puts the downstream figure at "only about one third of diversified mining capacity."

I would build the supply chain backward from actual magnet orders. Start with the grades and quantities the customer will qualify. Then pay for the separation, metallization, and alloy capacity that can deliver those inputs at a predictable cost. Verify where the oxide was separated as carefully as where the metal was cast. A metallization plant outside China can still depend on Chinese oxide. When I hear the next mine-to-magnet announcement, I will ask for the name of the plant that will make the metal, the specification it will meet, and the date it

can fill the first repeat order.