

The Calculus of the Risk

written by Jack Lifton | July 14, 2026

The phrase “the calculus of the risk” entered American legal thinking through the work of Judge Learned Hand. Although he never actually used those exact words, they have become the accepted description of the balancing test he articulated in his famous 1947 opinion in *United States v. Carroll Towing Co.* His reasoning was elegantly simple. Rational decisions require weighing the cost of prevention against the probability and consequences of failure.

That principle extends far beyond tort law. It is, in fact, an excellent way to examine the American attempt to rebuild a domestic rare earth permanent magnet industry.

For the past decade, investors have been inundated with grand announcements about “mine-to-magnet” strategies. Every few months, another company claims it will own the entire supply chain, from an ore body somewhere in the wilderness to finished permanent magnets destined for electric vehicles, wind turbines, robots, military systems, and whatever fashionable application currently dominates government policy.

It is an attractive story. It is also, in most cases, the wrong story. The permanent magnet business has never been about owning mines. It has always been about supplying manufacturers. That distinction may sound trivial. It is anything but. I have spent most of my professional life observing the rare earth industry from both the mining and manufacturing sides. One lesson has been repeated so consistently that it ought to be engraved above the entrance to every investment conference devoted to critical minerals:

OEMs do not buy mines. They buy qualified products. Everything

else is merely a means to that end.

The United States once possessed nearly every element of a competitive permanent magnet supply chain. Companies such as Magnequench and others developed world-class technologies. American scientists pioneered much of the underlying metallurgy. American manufacturers produced magnets that became essential components of modern electronics. Then economics intervened.

Manufacturing migrated to lower-cost jurisdictions. Technical talent followed production. Supply chains consolidated. China did not become dominant because it discovered some magical mineral deposit. It became dominant because it spent decades learning how to manufacture products consistently, economically, and at an industrial scale. There is a lesson in that history that investors should not ignore. Industrial capability is cumulative. Experience compounds. Competence has a learning curve.

None of those assets can be purchased simply because financing has become available. Yet today's financial markets continue to value many rare earth ventures primarily by the size of their mineral resources, as though the ownership of an ore body somehow implies the ability to produce separated oxides, metals, alloys, powders, and magnets. It does not.

Mining is one business. Chemical processing is another. Metal making is another. Alloy production is another. Magnet manufacturing is another. Each discipline has its own technologies, economics, operating culture, customers, and decades of accumulated practical knowledge.

The industry has a curious habit of pretending these distinctions are minor. They are not. This brings us back to Judge Learned Hand. His "calculus of the risk" asks a simple question. What does it cost to reduce the probability of

failure? For America's OEMs, that calculation has changed dramatically.

For decades, it was economically rational to depend almost entirely upon China for rare earth permanent magnets. The products were available, the quality was acceptable, the supply chain was dependable, and prices remained competitive. Today, those assumptions are no longer certain.

Export controls. Licensing requirements. Geopolitical tension. Trade disputes. Strategic competition. Whether one agrees with the politics is beside the point. Every one of those developments increases procurement risk. And procurement risk has a price.

That price is now being incorporated into purchasing decisions throughout the industrial world. Notice what has happened. OEMs are not suddenly becoming mining companies. They are not searching for ore bodies. They are searching for reliable suppliers. That is a profoundly different objective.

The companies most likely to succeed will therefore not necessarily be those possessing the largest deposits or the most ambitious PowerPoint presentations. They will be those who remove risk from their customers' purchasing decisions.

That may mean mastering solvent extraction. It may mean producing qualified rare earth metals. It may mean manufacturing high-purity alloys. It may mean producing finished magnets. It may mean partnering with companies that already possess those capabilities instead of pretending they can all be invented simultaneously.

The objective is not vertical integration for its own sake. The objective is reducing procurement risk. There is another lesson that industrial history teaches. Successful industries are

almost never built from the ground up in a single heroic effort. They evolve.

Competence precedes scale. Customers precede expansion. Profits precede integration.

The current American revival of permanent magnet manufacturing should therefore be evaluated not by promotional language but by industrial discipline. Who already knows how to operate? Who already has qualified customers? Who understands manufacturing rather than simply mineral exploration? Who is solving bottlenecks rather than describing aspirations? Those are the questions investors should be asking.

Not every company attempting to enter this business will succeed. History tells us that most will not. That is not pessimism. It is simply another application of the calculus of the risk.

Investors should remember that the rare earth industry has always rewarded those who understand manufacturing more than mining, customers more than conferences, and operating experience more than promotional enthusiasm.

Mineral deposits matter. Capital matters. Government policy matters. But none of those things, by themselves, creates an industry. Industries are created when manufacturers decide they can depend upon a supplier. Everything else is preparation.

Judge Learned Hand understood that rational people weigh probabilities before making decisions. OEM purchasing departments do exactly the same thing. In the end, they will decide which companies become part of America's permanent magnet revival. Not because those companies own the largest deposits. But because they have done the best job of calculating—and reducing—the risk.

That, ultimately, is the only calculus that matters.