The American Rare Earths Magnet Problem

written by Jack Lifton | October 8, 2026

There are many ways to describe America's dependence on foreign sources for rare earth permanent magnets. We can talk about mines, separation plants, metals, alloys, magnet factories, government subsidies, and billions of dollars in announced investment. But two numbers provide a much better starting point. In 2025, the United States consumed approximately 48,000 metric tonnes of neodymium-iron-boron permanent magnets and produced approximately 300 tonnes domestically. Those estimates, from Arthur D. Little and subsequently reported by Reuters, mean that American production supplied only about 0.625 percent of American requirements. The apparent magnet manufacturing deficit was therefore approximately 47,700 tonnes.

That is an extraordinary deficit, but I do not think it is the most important number. The more important question is this: **What happened to the American factories that would have used those magnets?** When we say that the United States consumed 48,000 tonnes of NdFeB magnets, we must not imply that American factories purchased 48,000 tonnes of magnets and incorporated them into American made products. A substantial portion of those magnets arrived in the United States already embedded in imported motors, compressors, actuators, automobiles, appliances, electronics, machine tools, and other intermediate and finished manufactured goods. The magnet was made somewhere else, but so was the motor, and frequently so was the finished product containing the motor.

This means that America does not have one rare earth magnet deficit, it has two industrial deficits.

(1) The first is obvious: **America does not manufacture enough magnets.**

(2) The second is much more serious: **America no longer manufactures domestically a substantial portion of the components and finished products that use those magnets.** This distinction is largely absent from the current American debate over critical minerals.

The United States has embraced the phrase “mine-to-magnet” as though it describes a complete supply chain. It does not. The actual industrial chain runs from the mine to separation, then to metal, alloy, and magnet; from the magnet to the motor or other magnet containing component; and finally to the finished manufactured product and its OEM customer. Stopping at the magnet stops the supply chain in the middle. The U.S. Department of Commerce recognized this in its investigation of NdFeB permanent magnets, concluding that a viable domestic magnet industry would depend on a sufficiently large proportion of the products directly incorporating those magnets, including vehicle drivetrains, also being manufactured in the United States.

That qualification is crucial. We can build magnet factories in America, but if the factories making the motors that consume those magnets are somewhere else, then the American magnet manufacturer may ultimately have to ship its magnets overseas so somebody else can make the motor. We would have recreated magnet manufacturing without recreating the industrial supply chain. There is nothing wrong with exporting magnets, of course, but exporting magnets should not be confused with rebuilding American manufacturing.

The first deficit is easy to calculate. American NdFeB demand in 2025 was approximately 48,000 tonnes, while American production was approximately 300 tonnes. The difference is 47,700 tonnes,

meaning domestic magnet production supplied only about 0.6 percent of American requirements. That is the measurable magnet manufacturing deficit.

The downstream manufacturing deficit is much harder to calculate because customs statistics record the product crossing the border, not every component within it. If a permanent magnet crosses the border by itself, Customs can classify it as a magnet. If the identical magnet crosses the border inside an electric motor, Customs records a motor. If that motor crosses the border inside an automobile, Customs records an automobile. The magnet has disappeared statistically even though it remains physically present.

Researchers have attempted to reconstruct this hidden trade. A peer reviewed study published in Mineral Economics examined American imports of sintered NdFeB magnets both directly and embedded in manufactured goods and concluded that more than 90 percent of the imported NdFeB magnets captured by its broader accounting were embedded in intermediate and finished manufactured products rather than imported simply as magnets. Motors were the dominant intermediate category. The Department of Commerce, using a different methodology and concentrating on essential civilian demand, estimated that up to 60 percent of essential civilian magnet demand could be satisfied through embedded imports.

These percentages cannot simply be applied mechanically to the 48,000 tonne Arthur D. Little estimate because they measure somewhat different things and refer to different periods. It would therefore be misleading to claim that we know precisely how many of America's 48,000 tonnes in 2025 entered as magnets and how many entered already installed in foreign manufactured products. We can, however, establish the order of magnitude. If we use the Commerce estimate of approximately 60 percent

embedded dependence as a conservative benchmark, then something on the order of 28,800 tonnes of NdFeB magnets could have entered the American economy already incorporated into foreign manufactured components and finished goods. I emphasize that 28,800 tonnes is an estimate, not a measured 2025 statistic, but I believe it is a useful working number.

This distinction tells us something much more important than another rare earth statistic. Tens of thousands of tonnes of magnets required by the American economy may already be arriving here, incorporated into things America did not manufacture. The United States has therefore outsourced not merely magnet production but a significant portion of the manufacturing that gives the magnets their economic value.

Consider an American company that constructs a 5,000 tonne per year NdFeB magnet plant. That sounds impressive, but my first question is: Who is the customer? If the customer is an American motor manufacturer producing traction motors in Michigan, then we have restored another link in the domestic industrial chain. If the customer is a motor manufacturer in China, Japan, Korea, Mexico or Vietnam, then we have not. We have simply created an American magnet exporter.

This becomes even clearer if we consider an automobile traction motor. The automobile manufacturer does not need neodymium oxide. It needs a motor. The motor manufacturer does not simply need “rare earths.” It needs magnets having precisely specified magnetic properties, geometry, coercivity, temperature performance, coating, dimensional tolerance, and lifetime reliability, delivered by the millions with reproducible quality and at an acceptable price. The motor designer therefore determines the required magnet specifications. The magnet manufacturer determines the alloy it needs; the alloy producer determines the metals it needs; the metal producer determines

the separated oxides it needs; the separator determines the concentrate it can process; and only then do we arrive at the mine.

This is why I have repeatedly argued that a critical material supply chain must be constructed backward from the OEM, not forward from the mine. The mine is the beginning of the physical supply chain, but the OEM is the beginning of the economic supply chain. The distinction is fundamental because there is no economic reason to produce a material for which there is no qualified customer.

China understands this very well. China's rare earth advantage is often described as geological, but geology alone does not explain its dominance. China developed separation, metal making, alloy production and magnet manufacturing, and then, most importantly, developed or attracted the enormous downstream manufacturing industries that consume those magnets. China makes motors, compressors, pumps, actuators, appliances, electronics, drones, automobiles, robots, and innumerable other manufactured products containing rare earth permanent magnets. The magnet factories therefore have customers immediately downstream. That is an industrial ecosystem. America is attempting to recreate selected pieces of that ecosystem, which is not the same thing.

The phrase "mine-to-magnet" has become politically attractive because it sounds complete. It is not complete. Suppose that through subsidies, loans, price guarantees, and government purchasing commitments the United States succeeds in creating 20,000 tonnes of annual NdFeB magnet capacity. That would unquestionably be an accomplishment. But suppose American downstream manufacturers require only a fraction of that output because many of the motors, actuators and assemblies ultimately sold in America are still manufactured overseas. The magnets must then be exported, sold at prices competitive with Chinese

magnets to the remaining American component manufacturers, or supported by continuing government intervention. The economics of the magnet factory therefore cannot be separated from the economics of the downstream manufacturing industry.

The Department of Commerce recognized this explicitly. Its Section 232 analysis concluded that domestic magnet producers could benefit from a sizeable and stable source of demand if enough products directly incorporating NdFeB magnets were manufactured in the United States and if the price differential between American and Chinese magnets could be sufficiently narrowed. I think the most important word in that statement is if.

We can now answer the question that should have been asked at the beginning: How large is America's magnet manufacturing deficit compared with its downstream manufacturing deficit? The magnet deficit is reasonably measurable. It was approximately 47,700 tonnes in 2025. The downstream deficit cannot be reduced to a single, equally precise number because it consists of thousands of categories of motors, components, and finished products. But using Commerce's embedded import estimate as a conservative benchmark suggests that something on the order of 29,000 tonnes of America's 48,000 tonne magnet requirement may have entered the country already embedded in foreign manufactured products. The peer reviewed trade analysis suggests that embedded dependence can be even greater when measured across imported sintered NdFeB magnets and the manufactured goods containing them.

The downstream deficit, however, is much larger economically than the magnet tonnage suggests because the magnet is only one component of the imported product. 29,000 tonnes of magnets embedded in foreign manufactured motors and finished goods do not represent merely 29,000 tonnes of missing American magnet

demand. They represent the motors, copper windings, electrical steel laminations, bearings, shafts, housings, power electronics, controls, software, engineering, assembly labor, and ultimately the finished products surrounding those magnets. The downstream value added that has migrated overseas can therefore be many multiples of the magnet's value.

That is the real American manufacturing deficit. You can't measure it simply in tonnes of rare earths. It must ultimately be measured in factories, components, skilled labor, engineering capability, capital equipment and value added.

When MP Materials Corp. (NYSE: MP), Noveon Magnetics Inc., e-VAC Magnetics (a subsidiary of Germany's VACUUMSCHMELZE), USA Rare Earth (Nasdaq: USAR), or any other company announces American magnet capacity, we should certainly ask how many tonnes it intends to produce, but that should only be the first question. We should then ask who is buying those magnets, what component will contain them, where that component will be manufactured, whether the magnet has been qualified by that manufacturer, where the final product incorporating the component will be manufactured, and whether the entire chain can compete economically without permanent government subsidy. Those questions tell us whether we are reconstructing an industry or simply constructing a factory. There is an enormous difference.

The objective of American industrial policy therefore should not be "mine-to-magnet." I would turn the expression around. The objective should be OEM-to-mine. Begin with the product America wishes to manufacture. Identify the component manufacturer and the motor, actuator or generator manufacturer. Determine the qualified magnet specifications, then determine the required alloy, metals and separated rare earth products, and only then determine which concentrate, mine or recycling stream can economically supply them. That is how a sustainable industrial

supply chain is actually constructed.

America certainly needs mines. It needs separation. It needs metal making and alloy production, and it desperately needs magnet manufacturing. But none of those industries can be considered in isolation from the manufacturers that consume their output. The 2025 numbers give us an excellent baseline. America required approximately 48,000 tonnes of NdFeB magnets, while America manufactured approximately 300 tonnes. Its magnet manufacturing deficit was therefore approximately 47,700 tonnes. A reasonable conservative estimate further suggests that perhaps 29,000 tonnes of that requirement reached America already embedded in imported intermediate and finished manufactured products, although the precise 2025 figure cannot presently be established from public statistics.

Policymakers should study that second number most carefully because it shows America has not simply outsourced its magnets. It has outsourced much of the manufacturing that gives those magnets their value. Rebuilding American magnet manufacturing without rebuilding downstream manufacturing would therefore solve only part of the problem.

A magnet has little economic significance sitting on a warehouse shelf. Its value appears when somebody engineers it into a motor, actuator, compressor, generator, medical device, automobile, robot or another useful manufactured product. If we want to restore America’s rare earth supply chain, we must restore not merely the ability to make the magnet but the industrial capability to make the things that use it. That is where the customer is. That is where the manufacturing capability resides. And, ultimately, that is where the value is added.

Source note: The 2025 U.S. NdFeB demand (~48,000 tonnes) and

domestic supply (~300 tonnes) figures are based on Arthur D. Little data. The embedded-import discussion draws on U.S. Department of Commerce Section 232 analysis and peer-reviewed research in Mineral Economics.