Is There an Inelastic Demand for Rare Earths?

written by Jack Lifton | August 28, 2026

“The quantity of rare earth contained in a motor may be small. The value of the industrial output prevented by its absence may be enormous.” – Jack Lifton, Critical Minerals Institute (CMI)

China and the Rest of the World Are Not the Same Market

The rare earth industry is surrounded by forecasts. We are regularly told how many electric vehicles will be manufactured in 2030, how many wind turbines will be installed in 2040, and how rapidly robotics, automation, artificial intelligence, and defense spending will increase the demand for rare earth permanent magnets.

These projections may describe possible futures. They do not, by themselves, establish that a commercial market will exist at the projected scale or price. Before attempting to calculate future rare earth demand, we should ask a more fundamental question: **Is the present demand for rare earths inelastic?**

The answer requires us to distinguish China—the world’s largest rare earth producer, processor, magnet manufacturer, and consumer—from the rest of the world. It also requires us to stop discussing “rare earths” as if they were a single commodity.

What Is Inelastic Demand?

Demand is described as inelastic when a substantial change in price produces a relatively small change in the quantity buyers

purchase. That does not mean buyers are indifferent to price. It means they cannot readily reduce consumption, substitute another material, redesign their products, or stop buying without suffering consequences greater than the additional cost.

For an industrial material, the most revealing question may not be what happens when its price rises. The better question is: **What happens when the material is unavailable at any price?**

If a manufacturer cannot make its product without the material, has no qualified substitute, and cannot redesign the product within the required time, its short term demand is inelastic. The manufacturer must obtain the material or stop production. This is particularly important when the material represents a small percentage of the finished product's total cost but performs an essential function. A large increase in the price of a rare earth magnet may add relatively little to the cost of an automobile, industrial motor, missile guidance system, or computer drive. The manufacturer may therefore continue buying despite a very large increase in the magnet's price. That is short term inelasticity.

Over time, however, the manufacturer may reduce the amount used, change motor designs, qualify another supplier, substitute a different magnet technology, recycle material, or abandon the application. Demand can consequently be highly inelastic during an immediate supply interruption and considerably more elastic over five or ten years. Any discussion of criticality must specify the relevant period.

There Is No Single Rare Earth Market

The term "rare earths" covers seventeen elements, but those elements do not have one common market. Cerium used in polishing materials is not economically interchangeable with neodymium and

praseodymium used in high performance permanent magnets. Lanthanum used in catalysts does not face the same demand conditions as dysprosium or terbium used to improve the temperature performance of certain magnets.

The supply side is also unusual. Rare earths occur together in mineral deposits but not in the proportions demanded by the market. A mine cannot ordinarily decide to produce only the element whose price is highest. It produces a natural distribution of elements that must be separated and sold into different end use markets. The result is a collection of related but fundamentally different markets. Some rare earths may be oversupplied while others are scarce. Some applications may be price sensitive, while others have no immediately acceptable substitute.

Asking whether demand for “rare earths” is inelastic is therefore like asking whether demand for “metals” is inelastic. We must identify the element, its chemical or physical form, its application, its customer, and the period over which the customer can respond.

China Is the Center of Actual Demand

China’s position in the rare earth industry is often described by citing its share of mining. That understates its importance. For rare earths used in magnets—principally neodymium, praseodymium, dysprosium, and terbium—the International Energy Agency estimated that China accounted for approximately 60 percent of mining, 91 percent of refining, and 94 percent of sintered permanent magnet production in 2024. These figures describe different stages of the supply chain. They should not be treated as interchangeable measures of demand.

The most important figure for understanding the market may be

China’s share of magnet manufacturing. A country producing nearly all the world’s sintered rare earth permanent magnets necessarily purchases and processes enormous quantities of separated rare earth products, metals, and alloys. Recent economic modelling has placed China at about half of global refined rare earth consumption. Whatever precise estimate one accepts, China is far and away the largest national consumer. But even “Chinese consumption” needs interpretation.

Some rare earth material consumed by a Chinese magnet manufacturer is embodied in a magnet exported to Europe, Japan, or the United States. Some magnets remain in China but are installed in motors or assemblies that are subsequently exported. Others are incorporated into Chinese made vehicles, electronics, wind turbines, robots, and industrial equipment sold domestically. Thus, China’s industrial demand is not identical to Chinese final demand. A substantial part of it is derived from manufacturing products for customers elsewhere.

This leads to a central fact about the rare earth market: **China and the rest of the world are different markets, but much of the rest of the world’s demand is expressed through Chinese factories.**

Is Chinese Demand Inelastic?

China’s demand is supported by an industrial system extending from mineral concentrates through separation, metals, alloys, magnets, motors, components, and finished products. This integration gives Chinese manufacturers important advantages. They operate close to suppliers, benefit from accumulated technical knowledge and scale, and can balance material flows across numerous customers and applications. It may also give them more ways to respond to price changes than are available to an isolated Western consumer.

A large Chinese magnet manufacturer may be able to alter material formulations, reduce the use of heavy rare earths, shift production among customers, use inventories, obtain material from affiliated suppliers, or accept lower margins temporarily. Chinese industrial demand may therefore be large and strategically important without being equally inelastic in every application.

China can also influence both sides of its domestic market through production quotas, industry consolidation, inventories, subsidies, environmental enforcement, export controls, and support for downstream manufacturing. Consequently, observed Chinese demand is not simply the result of an unfettered commodity market. It is partly the product of industrial policy and China's deliberate development of downstream industries. This does not make the demand unreal. The factories, workers, equipment, and customers exist. It does mean that market behavior cannot be understood from price alone.

Is Demand Outside China Inelastic?

The rest of the world presents a different picture. Many non-Chinese manufacturers do not purchase separated rare earth oxides directly. They buy magnets, motors, components, or finished assemblies. Their dependence on rare earths may therefore be real but partly invisible. A Western automaker may not consider itself a rare earth consumer, even though a vehicle cannot be completed without rare earth permanent magnets embedded in multiple components. When supplies are readily available, this distinction may not matter. During a disruption, it becomes decisive.

The export restrictions and licensing delays imposed by China in 2025 demonstrated that manufacturers outside China could not always replace affected magnets quickly. Some automotive

companies reportedly reduced production or temporarily stopped production while awaiting supplies. That is evidence of short run inelasticity—not necessarily because buyers willingly paid any price, but because **qualified** alternatives could not be obtained within the time available.

At the same time, a temporary production stoppage reveals something that a demand forecast does not: the economic consequence of the missing material. The quantity of rare earth contained in a motor may be small. The value of the industrial output prevented by its absence may be enormous.

Criticality Is More Than Forecast Growth

Government definitions of critical minerals generally combine two ideas: the material performs an essential economic or strategic function, and its supply chain is vulnerable to disruption. Inelastic demand is relevant to this analysis because it helps measure how consumers respond to a shortage. But it is not the whole definition. A material can have inelastic demand and still not be critical if its supply is abundant, diversified, and secure. Conversely, a material supplied by only one country is not necessarily critical if users can quickly substitute with an alternative at low cost. Criticality arises from the combination of:

- an essential function;
- limited short term substitution;
- serious consequences if the material is unavailable; and
- a vulnerable or concentrated supply chain.

Future demand growth is not required to establish any of these

conditions.

A material needed in the same quantity every year can remain critical if its absence would close factories or disable essential systems. Conversely, a material forecast to experience spectacular growth may not be critical if consumers can readily change technologies or decline to buy at the forecast price.

Forecasts Are Scenarios, Not Purchase Orders

Rare earth forecasts generally begin with assumptions about future production of electric vehicles, wind turbines, robots, drones, data centers, and military systems. Those assumptions are then multiplied by estimated material intensity. The calculation may be mathematically correct while its conclusion remains commercially uncertain.

A forecast of vehicle production is not a purchase order for magnets. A forecast of magnet demand is not a purchase order for neodymium-praseodymium oxide. It says nothing by itself about the price customers will accept, the specifications they will require, the suppliers they will qualify, or the substitutions they will make. Forecasts are conditional stories. Too often, they are presented as measured demand.

We should begin with the existing market instead. Who is buying the material today? In what form? For which application? What portion of the finished product’s cost does it represent? What alternatives have already been qualified? How long would substitution take? What happens if deliveries stop? Those questions will tell us more about criticality than another curve extending smoothly to 2050.

The First Conclusion

There is evidence of highly inelastic short term demand for certain rare earth products, particularly qualified permanent magnets and the magnet rare earths needed to manufacture them.

But there is no defensible basis for declaring that all rare earth demand is inelastic. China has the world’s largest and most integrated demand base. The rest of the world has smaller direct demand but substantial indirect dependence on Chinese magnets, components, and manufacturing. The two markets cannot be separated simply by assigning tonnage to the country in which an intermediate material was consumed.

For investors and policymakers, the relevant question is not how many tons of “rare earths” the world might consume in 2040. It is this:

Which specific rare earth products do today’s industries have to continue buying, from whom can they buy them, and what happens if those supplies are interrupted?

That is where any serious assessment of criticality should begin.