

The Critical Minerals Secret Supply Chain Sauce is in the Technology Companies

written by Jack Lifton | March 17, 2025

“Critical minerals aren’t about mining; they’re about chemistry and process engineering. Politicians and industry leaders who fail to grasp this leave us strategically exposed. China’s dominance isn’t geological—it’s technological. Until we build fully integrated domestic supply chains, we’re choosing dependence over security.” – [Jack Lifton](#), Co-Chair, [Critical Minerals Institute](#) (CMI)

Critical minerals, in the forms of minerals, do not appear in technology-driven devices, the operations of which are enabled by the electronic properties of specific forms of selected chemical elements for their operation.

This means that it is not the mining of “critical minerals” that is of primary importance, but rather, their complex and multistage processing for the selective recovery of specific chemical elements contained in the composition of the minerals and their successive purification and transformation into the chemical forms, metals, and alloys that are used in further very complex processing to form the active physical components of the electronic and electromechanical devices, only the final forms of which, 99.99% of us ever see and use with no understanding at all of how the devices are made or how they work.

The tiny, unrecognized, and silent group of workers who engineer the results of solid-state physics and chemical science into mass-produced technologies are mostly just observers of the

uneducated and technologically illiterate reporters and politicians who speak about technologies, the creation of which and the operations of which they do not understand.

Therefore, it is not surprising that governmental policymakers do not understand the details of the supply chains necessary to mass-produce rare earth permanent magnet motors because their advisors do not understand the details or intermediate stages of the complex supply chains essential for their mass production.

Only the usually overlooked process technology providers can provide a detailed and comprehensible survey of the steps it will take, the processes and their economics it will use, and the selection of end-user forms to be produced and inventoried or ready to produce on a just-in-time basis for customers needing that service.

The total necessary supply chains for producing high-tech end-user components and finished technology devices are ever-evolving as customer demands change and/or are themselves affected by technological change. Only the most well-managed dynamic, not static, suppliers of the necessary forms of critical technology metals for manufacturing end-user products can survive. It is the selling prices of their end-use products, not the prices of mineral concentrates at the mine that determine the demand for any and all mined minerals that are the beginning of the total supply chains for product manufacturing.

To value the enterprises that comprise a total supply chain for a technology enabled product for either the consumer market or the much more limited military market, it is necessary to determine the place of that enterprise in both the supply chain and the value chain for the product(s).

Finally, to evaluate technology companies as components of total supply chains, it must be understood that the small military

demand for technology-metal-enabled devices is not driven by price but by the need for national security. Aircraft carrier construction contracts are not canceled when the price of uranium fuel for their nuclear reactors trebles, and no crash programs to replace those reactors with ones fueled by, for example, thorium are undertaken. For critical military needs, price determines the number of weapons that can be bought, not whether or not they will be purchased.

The opposite is true for consumer products. The price range for technology metal-enabled components must fall within a range determined by the overall cost of the finished product. Today, with the increasingly high-tech nature of mass-produced high-end consumer goods, the costs must be considered at every step of the total supply chain. More and more, these costs are distributed along a vertically integrated supply chain so that the failure of one specialized venture to be profitable does not destroy the competitive viability of the finished product.

Thus, to create, for example, a rare earth permanent magnet motor industry for consumer EVs, it is necessary first to identify each stand-alone component of the total supply chain, then determine if such ventures exist and, if not, whether or not they can be created as profitable ventures. Then, if that individually based profitable component company chain does not exist, it must be determined if it can be made by joint ventures, establishing individual ventures, or vertically integrating them under the umbrella of the end-user product manufacturer.

The U.S. Department of Defense has done the latter for its needs for rare earth permanent magnets.

So far, no consumer products manufacturer has done this.

This is China's massive advantage over us.