

# Energy Fuels pioneers American rare earth supply chain rebirth

written by Jack Lifton | June 24, 2024

Actions, not plans, are the measures of success and failure. The U.S. and EU central governments' currently emphasized plans to derisk their respective manufacturing industries from Chinese control of the most critical minerals and their downstream formed products have failed because their respective plans were crafted by "experts" relying on other experts, none of whom had any subject matter knowledge of the operations and economics of the individual components of the total supply chains they wished to disrupt for their "nation's" benefit.

[Energy Fuels Inc.](#) (NYSE American: UUUU | TSX: EFR), an American uranium miner and processor, led by one of America's best mining engineer/businessman [Mark Chalmers](#), has taken action and succeeded on its own, without government largesse to create from scratch the first two elements in a total domestic American rare earth permanent magnet supply chain. Energy Fuels just last month [commissioned](#) the first commercial-scale rare earth, solvent extraction (SR) based, monazite feedstock-based, separation plant **ever** constructed in the United States.

Energy Fuels designed and built its new SX plant entirely in-house, based on the company's 40+ years of **experience** in operating solvent-extraction systems designed to separate high-purity uranium and vanadium. In addition, the company designed, built, and is operating the largest extraction system for monazite ever built in the United States to produce the pregnant leach solution (PLS) required as the feed for the SX system.

The unambiguous ignorance of politicians, journalists, and the self-selected academic “experts” who advise them on the topic of the available supply of minerals that are critical for the decarbonization of the energy economy is leading policymakers to very bad decisions, and taking “actions” that are not only enormous wastes of money, but also of no value to the need to construct at least a basic secured supply, of domestically manufactured, rare earth permanent magnets.

It is my opinion that Energy Fuels today is America’s leading authority on rare earth extraction from monazites and on the separation of the contained rare earths into the individual rare earths and blends required for the manufacturing of rare earth permanent magnets.

And, Energy Fuels is not stopping at the production of individual rare earths with the specifications required by magnet makers, it is also actively reviewing internally generated plans to build a state-of-the-art rare earth metal and alloy production system by the end of 2026, at the latest. It is likely that such a metal and alloy system producing metals and alloys to the exact specifications of rare earth permanent magnet makers will be the most credible and reliable commercial system in the Americas at that time.

The American OEM “plans” for EVs are based on building component manufacturing plants before their upstream supply chain components are sourced. This huge gamble is beginning to unravel and may prove financially disastrous for the American OEM automotive industry.

Energy Fuels’ “actions” are designed to ensure a supply of separated and purified rare earths, and ultimately, of the rare earth metals and alloys necessary to manufacture rare earth permanent magnets.

Energy Fuels, however, will only produce profitable products, so its output of rare earth products will only be available to those whose “action plans” include far-seeing offtakes to ensure the necessary supplies for their products.

Unlike the many American companies that plan to be the “biggest” suppliers of their core commodity or product, Energy Fuels’ actions ensure that it is and will be America’s premier rare earth products company.

It is clear to anyone who looks at the geological data and has a knowledge, or at least an informed (by experience!) overview, of modern chemistry and chemical engineering that mining engineering in 2024 is incapable, financially, of recovering for use any more than a fraction of what would be needed of the minerals critical to the total global decarbonization of the energy economy using currently known technologies and fossil-fueled energy.

A reader at this point might look at the above paragraph and say that it’s based on a logical fallacy, an appeal to authority, rather than on data analysis, but it’s that type of fallacy, an appeal to unqualified authority, that drives the entire climate change crisis, which is an appeal to the authority of the scientifically, economically and culturally ignorant and illiterate.

The problem is the widely accepted metric known as “earth abundance.” This is defined as the proportion of a given chemical element in the earth’s crust, the forty kilometers or so of (mostly) solid rock that overlays the earth’s interior. The scientists who have measured a few points at significant depths have decided that the crust has a generally uniform distribution of chemical elements when taken as a whole, even if there are occasional concentrations of some of them at or near

the surface.

Those occasional concentrations present as minerals that have more than the average (earth abundant) content of a metal or metals. These concentrations are formed by geological chemical processes and the ones that occur at or near the boundary between the atmosphere and the crust (aka, the earth's surface) may also be affected by the processes known as "weather" and although these weathering processes may take millions of years to operate, they are still quicker than the billions of years it took for the molten earth to cool and differentiate its surface from its interior. These processes are not "organic," once they have occurred and the near surface minerals have been extracted (mined) and processed (refined into useful forms) the deposits are gone and will not reform or refill.

Additionally, for a deposit to be a useful mine, mechanical and chemical processes that are practical and economical must be available in order to refine the extracted minerals, and produce metal that is affordable.

And, such deposits must be accessible to necessary infrastructure, such as roads or rail, electric power, and fresh water.

The limitations of human ingenuity and simple cost issues limit the economic recovery of chemical elements from deposits to those with high grades (concentrations). All such deposits, no matter what the grade are limited in extent by geological and weathering processes that either occurred millions or billions of years ago or take thousands of centuries to have an effect. As mining exhausts the high grades of a deposit, the extraction and concentration to processable levels of lower grades becomes so costly that at some point the mine's life is over.

Of course, chemical engineering has been advancing, so that we

hear daily of companies that will “mine” tailings (mining residues) to get additional desired metal values that were too low in grade to be recoverable in the past, usually due to economics.

Note that the concentration of minerals has been a chemical/mechanical process known as flotation for about 125 years. Lately it has become possible to use electromagnetism and optical processes to sort and thereby concentrate some previously ignored ores and residues to workable levels of concentration.

But the variety of chemical reagents necessary to extract the desired metal values from the concentrates is quite small due to chemical engineering costs. Academics are always proposing new “reagents” for various aspects of cracking and leaching ores or for separating mixtures of related elements but almost invariably these new reagents are simply too costly to be economically deployed.

In a previous article, I have demonstrated why there simply is not enough lithium, as an example, accessible and available to us, to globally completely transform fossil fueled transportation and electrical grid buffer-storage to non fossil fueled operation.

China, having seen this problem coming more than a decade ago has already deployed trillions of dollars of capital and millions of man-years into preparing itself to have a low-cost energy basis for a non-fossil fuel energy regime. China dominates the processing of lithium and the manufacturing of lithium based rechargeable storage batteries. It has acquired worldwide control or ownership of more than 60% of the accessible, recoverable lithium; it processes 80% of the world’s cobalt; it processes 60% of the world’s copper; and most of the

gallium, indium, germanium, silicon, tellurium, and the rare earths.

Deglobalization is merely cementing China's dominance in the materials necessary for the production and use of alternate energy.

Central and South American governments along with many in Africa are nationalizing critical mineral natural resources, and even if the nations involved can't utilize the minerals directly they are requiring foreign buyers to add value in the country of origin, so as to create employment and wealth downstream of the physical extraction of the mineral.

The experts, who include Elon Musk as well as the CEO of Volkswagen have been separately quoted lately as saying that there is no shortage of lithium. The miners are just moving too slowly.

These men and many others are simply wrong, and the tragedy is that those who are wrong are in charge and are deploying trillions of dollars in a lost cause that only indebts a generation and robs it of the cheap energy that is the basis of a modern society.

China alone today has sufficient resources of critical minerals, processing, and fabricating technologies to ensure and secure for itself the low-cost energy that is the basis for prosperity.

The rest of the world will now fight for critical mineral resources just to maintain a declining standard of living.

It's time to stop listening to the experts and follow the action takers.