

The Central Processing of Critical Metals, an Idea Whose Time Has Come

written by Jack Lifton | April 1, 2022

If individual nations and politically aligned regions are to achieve self-sufficiency and security of supply, as soon as possible, for the critical metals necessary for their defense and consumer economies, then the most efficient use of time and money in pursuit of these objectives is of paramount importance and duplications of effort are to be avoided at all costs.

This means that the central processing of the beneficiated ores and scraps containing recoverable quantities of the desired critical metals is the best solution to avoid the paramount deficiency in the downstream processing of critical materials into customer-specified end-use forms; the lack of educated, experienced, and demonstrably skilled chemical and metallurgical engineers specialized in hydro-, pyro-, metallurgical, and manufacturing engineering, whose training and opportunities for experience in the West have been scaled down dramatically since the politicians in the West failed to adopt an industrial policy to maintain not only secure supplies of critical materials, but also of [critical skills](#).

Dr. Chris Haase, the former Director of the Critical Materials Institute of the U.S. Department of Energy recently spoke with me about this topic, and he said that “the resulting [political] weakness of the US natural resources industry has caused a significant decline in the number of newly trained mining, metallurgical, and extractive metallurgical engineers in the US.” He added that “Recent data show that the United States graduates fewer than 207 hydrometallurgical engineers annually.

Hydrometallurgy is a combination of multiple functional specialties that target the recovery of metals from their ores and scraps using fluid-based processes, by applying multiple processing steps involving physical, chemical, and sometimes electrical processes that include beneficiation, dissolution, and concentration that allows the separation, purification, and refining of finished metal and alloys. Achieving economically and environmentally sustainable operations requires a confluence of skills and expertise to deliver value at scale.”

“Unfortunately,” he added, “the closure and/or sales of major US mining corporations in the 1970s and 80s resulted in the closures of nearly all corporate mining and extractive research and development labs. The closure of the US Bureau of Mines in 1996 and the transfer of its accountabilities to the US Geological Survey and the US Environmental Protection Agency further bifurcated and balkanized US hydrometallurgical research, development, and advisory capabilities. The remaining US know-how and technical capabilities reside primarily in [just] a handful of select mining universities (e.g., Colorado School of Mines, New Mexico Institute of Mining & Technology, South Dakota School of Mines, University of Idaho School of Mines), US National labs (e.g., Oak Ridge National Labs, Idaho National Labs, Ames Lab), and largely retired, nationally recognized experts with industrial experience.

Because hydrometallurgical processing and technology are essential for the production of critical materials necessary to deliver a future clean energy transition and to support strategic (i.e., military and high technology) supply chains as well as the vastly larger consumer industries it is of vital national importance to preserve, advance, and champion the hydrometallurgical discipline, capabilities, know-how, and technology research and development necessary to support US competitiveness.” It is also extremely necessary to **conserve**

these critical skills.

The best way to restore American self-sufficiency and security of supply of critical natural resources is to consolidate and thereby maximize the efficient use of America's legacy skills in mineral resource exploration, processing, and the mass production of useful forms of the natural resources by minimizing government involvement where it, government, has the least skills. These areas include finance and non-health and safety regulations.

Left on its own, the American minerals industry maximizes the efficient use of capital, because capitalism is unforgiving of its inefficient use.

Left on their own the best managers in the natural resource industries have come to the conclusion the dwindling skill reserves of the American natural resource industry mandate the creation of central processing facilities where the large variety of ores, scraps, and residues for various non-fuel minerals of critical metals can be preprocessed to prepare feedstocks for further processing into useful forms by the most efficient technologies the cost and capacity of which is not prohibited by insufficient feedstocks. This is exactly what China is now doing in the rare earths' space!

An American industrial policy would encourage the financing of centralized toll processing, minimize non health regulation and permitting, and otherwise get out of the way. Successful clean energy policies must be result-oriented, and reality-based, not just policy statements. The research and development of clean energy nonfuel minerals integrated processing technologies must be encouraged both at universities and at the industrial level. This is how the U.S. Defense Department procurement has always operated. The technological spinoffs of their work underpin

today's global consumer as well as defense technologies.

Only an industrial policy, the success of which is judged by performance to objective, not the enrichment of governing cronies, can save the USA from second class status in a world where nations with such policies are already succeeding beyond the dreams of the senescent "progressive" capitalism being preached in the United States.

During World War II, capitalism with American characteristics gave the world the richest, most powerful, most opportunity-laden for all, nation in mankind's history.

It's time to revive that spirit.

China is winning the war for the future.

written by Jack Lifton | April 1, 2022

The perennial key geopolitical and geoeconomics issues of the conflict among nation-states over the allocation of scarce critical natural resources have, in the last 25 years, been dramatically affected by the current wave of the globalization of the ownership and of the productive output of natural resources, primarily in Africa and South America. Contemporary globalization has worked very much in the favor of the Peoples' Republic of China (PRC). China's goal of self-sufficiency in all natural resources, technologies, and industrial manufacturing for the stated purpose of achieving total independence from the rest of the world is well on its way to success.

China has combined a coherent industrial policy, based on the above stated goal, and has given that policy a driver with what it calls "[capitalism with Chinese characteristics](#)," which turns out to be not profit-centered but national goal-centered capitalism.

One result of Chinese goal-centered capitalism has been the decline of North America's and Western Europe's dominance as the industrial manufacturing and technological innovation centers of the world. The very same Chinese consumer market for manufactured goods that caused a boom for Western OEMs has been redirected to favor Chinese domestic OEMs to move China into its new era of the policy of dual circulation, the gradual substitution of domestic consumption for export markets.

Western politicians are frantic to keep their consumer products' boom going, so they are paying lip service to the notion of a consumer oriented free-market economy based on profit while more and more (disastrously) trying to manipulate that same consumer market demand without any real understanding of supply economics.

The best example of the failure of the Western approach is the looming and unnecessary energy poverty creating a political theme of an amorphous danger (aka as "boogeyman") called climate change, a "crisis" being used to attempt to manipulate consumer demand through concepts called "clean energy" and the "Green Economy."

Nowhere is there a better example of this than the current political mania for the electrification of transportation power trains. Self-described "experts" and "analysts" confidently predict the market penetration of so-called EVs, electric vehicles, over the next decade and well beyond. But [these predictions](#) fail miserably when analyzed through the prism of

what is known about the existence, accessibility, volumes, and economics of deposits of the critical technology metals that would need to be present for such predictions to be viable. Further analysis of the current production, distribution and use of electricity is necessary.

Ninety nine percent of the world's transportation runs on oil based fuels, the distribution of which is in effect universal. The same cannot be said for electricity.

The recent breathless coverage of weather "extreme" events, drought in California, hurricane in Louisiana, and flooding in New York and New Jersey have two things in common; one is that they are blamed on "climate change"; and a second thing, that no one in journalism seems to have noticed, that all of, and each of, these events have dramatically reduced or eliminated the flow of electricity to consumers in the affected regions, not just by generation reduction but primarily by disrupting the distribution of reliable electricity.

Imagine, for a moment, that you are a perceptive observer of the U.S. electrical energy production industry and of its distribution industry. (Note, you therefore couldn't and wouldn't be a mainstream media journalist). How would "greened" emergency services, for example, be able to fulfill their charge (excuse the pun) without reliable continuous electric energy production? The answer is that they will rely and always must rely on fossil fueled vehicles and localized electric generators.

Now further imagine that such fuels and vehicles have been made extraordinarily expensive due to the increased costs (due to supply reduction following forced demand reduction) of fossil fuels, storage batteries, and the need for reliable backup power generation.

The legacy power distribution systems of America and Europe cannot even today cope with extreme weather events and government paid emergency services can only function with off-the-grid power sources. China has a lesser problem, because its electric power generation and distribution are being built on a national scale with exactly the problem, the interruption of power distribution, I am describing being considered and taken into account by China's industrial policy execution bureaucracy.

How would (will) a California city, such as Los Angeles, function in a heat wave/drought when the choice is between air conditioning or charging your electric car? The famous "Valley" society of the Los Angeles complex grew originally after World War II with "all electric homes."

How will steel, aluminum, and copper be mined, refined, and fabricated without baseload, continuous and reliable, electric power to sustain the enormous continuous drains of power that batteries cannot sustain? Such flows cannot be created or sustained by solar panels and wind turbines.

And note that without a steady increase in the production of copper, which is refined ELECTROchemically and melted in electric furnaces, there can be no clean or green energy transformation. And that there can be no production of the companion metals upon which our electronics depend without massive production of the base, structural metals, within which they occur in tiny quantities. So, paradoxically and ironically, mining will have to increase manyfold and baseload fossil and nuclear electric generation would have to be increased dramatically to sustain the flow of scarce technology metals for the "greening" of society.

There is, of course, an alternative. Electricity for air

conditioning, lighting, and transportation can be allocated by privilege, I.e., economic class. The wealthy and their servants will have all that they need and the rest will simply exist in a dry, hot world of water and food rationing. Politicians by the way will rate as “servants” of the wealthy. That must be what the Western politicians think, because that is the world they are creating.

The real question is: Will the climate change “crisis” collapse the fragile democracies of the West before anyone comes to their senses outside of China. Note that China already has secured sufficient supplies of all the metals it needs to avoid the supply crisis now barreling down on the West.