

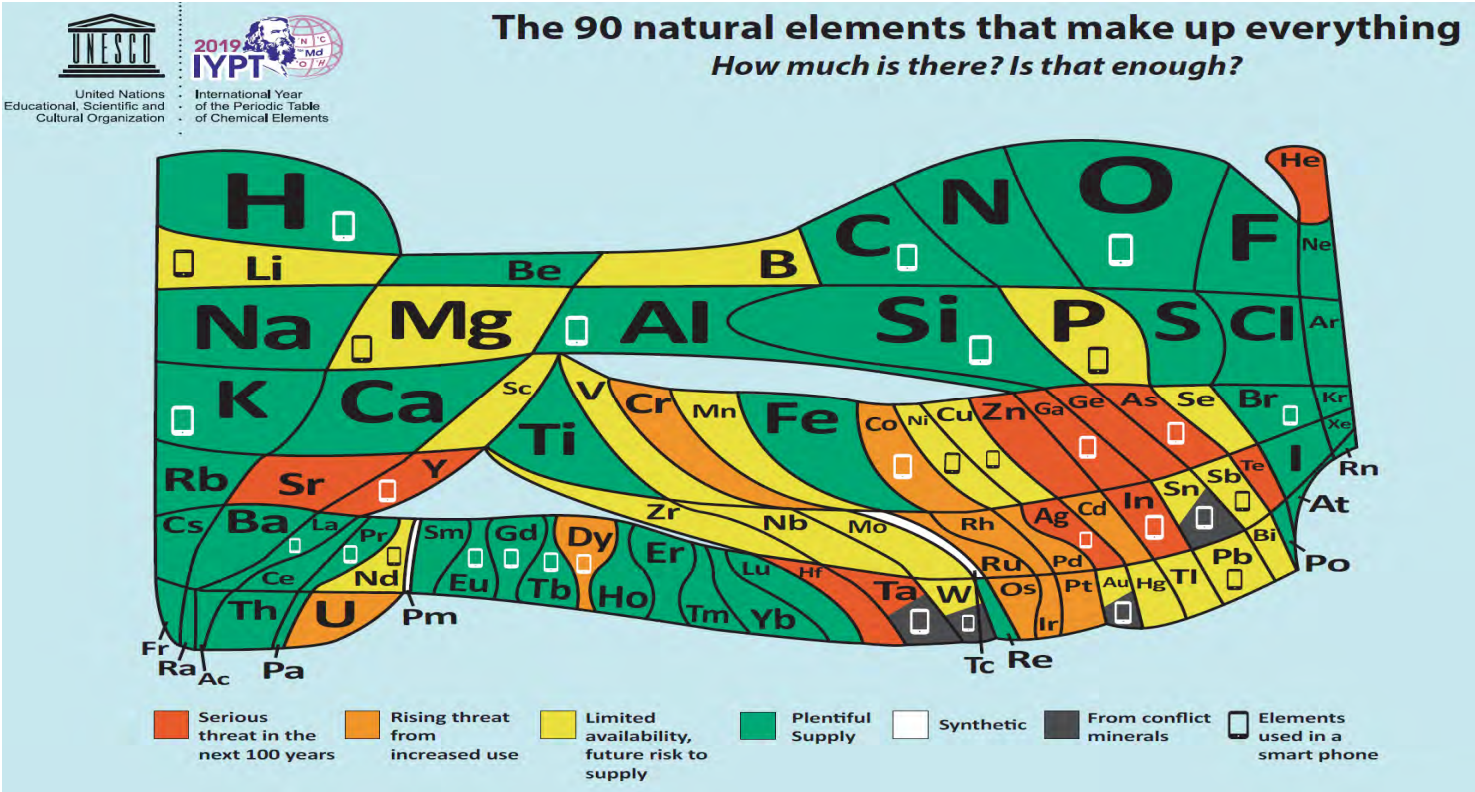
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Critical Minerals and Mining in the US



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by Stuart Levit, CSP²

The US designates certain minerals critical, and seeks to ensure they are reliably available to satisfy US national security and economic priorities. Of note, although many public sources and some state governments use the terms “critical minerals” and “strategic minerals” fairly interchangeably, the US government does not use the term “strategic minerals”, only “critical minerals”.

The US Geological Survey tracks the industries of about [90 different mineral commodities](#), but only 23 have been designated as critical. Mineral commodities that have important uses and no viable substitutes, yet face potential disruption in supply, are defined as critical to the Nation’s economic and national security. A mineral commodity’s importance and the nature of its supply chain can change with time, such that a mineral commodity that may have been considered critical 25

years ago may not be critical now, and one considered critical now may not be so in the future.

There have been multiple Executive Orders relevant to the issue. Industry has relied heavily on President Trump’s September 30, 2020 Executive Order. This Order focused on prioritizing domestic production and processing, which appears to have changed the dynamic for individual mines to capitalize on their contribution to domestic production of critical minerals, no matter how tiny those contributions may be. President Trump’s 2017 Executive Order 13817 most aggressively promoted mining development and permitting by specifically prioritizing enhanced and streamlined access to mineral information for mining interests, exploration, permitting, and processing.

On February 24, 2021, President Biden issued Executive Order 14017 on America’s Supply Chains which stated that the US needs diverse supply chains to ensure economic prosperity and national security,

and that these can be threatened by things ranging from cyber-attacks, terrorism, geopolitical and economic competition, to climate issues and pandemics. The Order sought to implement interdepartmental actions to assess relevant resources, identify sources and risks to their production and availability, etc. The US Departments of Commerce, Energy, Defense, and Health and Human Services were identified to assess and prioritize the materials identified as important and their sources, threats to availability, solutions to supply resiliency, etc.

The individual Departments, of course, have both overlapping and individual priorities and definitions for many of these things. The Department of Defense notably looks at national defense and economic prosperity, developing and sustaining emerging technologies, improving warfighting capabilities, and strengthening national alliances and partnerships. The Department of Energy relies on the Energy Act of 2020 to define critical materials as things the Secretary of Energy determines have a high risk of supply chain disruption function in energy technologies (transmission, storage, conservation). It also defines critical mineral as those things defined by the USGS as critical.

A tie that binds many of these things together, and is possibly most relevant to mining issues, is the US Geologic Survey's (USGS) assessments and listings of critical minerals. These notably include what is known to be produced and refined and estimates of materials in the ground.

The identification of things that are critical to the US' security and economic well-being are of course very important. But the issue and conversations can get murky when it is actually employed for various purposes – many of which can appear intended for the betterment of the US and the goals of various Executive Orders - but in reality are attempts to promote mines but not provide significant benefits to those goals. Identifying critical minerals can be fraught with politics, posturing, and lobbying by mining interests to include elements in the government listings that may not belong. The important goal of mineral availability gets mired by misinformation, misrepresentation, and greed.

Industry and in particular mine proponents regularly co-opt the issue to, for example, promote individual mines that supposedly promise to contribute to mineral supply solutions, such as lithium, cobalt, or rare earth minerals. These industry statements are not necessarily inherently false, but they pander to and foment fears regarding mineral reliance and suggest seemingly limited or false solutions.

The amount of these minerals that can actually source from those mines can be insignificant. This significance is subjective, but becomes an important consideration when it is measured against the negative impacts of those mines. A mine that may produce a fraction of a fraction of a percent of a rare earth element may also degrade human health and the environment. Current discussions seem to prioritize critical minerals, without actually considering or balancing the minimal contributions a mine may make with the mine's significant impacts to human health and the environment.

Aluminum

Aluminum provides a thoughtful example of designating minerals as critical, and how time and events can change those things. Aluminum has always been one of the most common elements in the Earth's crust, but it has not always been so easily obtained. In fact, the ceilings of the Library of Congress and the crown of the Washington Monument were once covered in aluminum as a symbol of status, because aluminum was worth more than silver. However, once scientists figured out how to extract aluminum from bauxite ore, aluminum suddenly became much easier to produce, and its value plummeted in turn.

Because of its plentiful availability in the earth's near-surface crust and effective extractive technologies, aluminum underscores that the nature of a mineral's critical designation can change in an instant. That is particularly important when compared to the long timeframe required to permit a mine (a decade is not unusual) and the forever-nature of many mine impacts (such as to water quality, land use, fish and wildlife, etc.).

Lithium, Cobalt, and Batteries

The growing demand for electric vehicles has significantly increased demand for batteries, which has accelerated battery technologies and production to confront supplies and sources and supplies of the essential minerals used in batteries. Lithium, cobalt, and other metals dominate headlines and discussions. The changes in technologies directly translate into changes in demand. For example, Tesla has significantly altered its battery composition in response to many factors. Generally, auto sector batteries have been based on nickel-cobalt-manganese. Every change in composition and ratio impacts the huge demands these batteries have on supply chains. The critical nature of a mineral today can change.

Similarly, demand for minerals such as cobalt is evolving based on evolving technologies. The USGS reports that, depending on the application, substitution for cobalt could result in a loss in prod-

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*The Center for Science in Public Participation
is a 501(c)(3) non-profit corporation
Volume 28, Number 1, Summer 2024*

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uct performance or an increase in cost. The cobalt contents of lithium-ion batteries, the leading global use for cobalt, are being reduced; potential commercially available cobalt-free substitutes use iron and phosphorus. As these changes are explored and implemented, cobalt markets are likely to change.

Demand is also impacted by recycling, which is emerging and increasing in the US. Recycling is likely years from providing sufficient quantities of critical minerals to satisfy demands, but even if it takes ten years to yield substantial quantities, this is quicker, and arguably much more sustainable than pursuing a mine today that will take the same or longer to produce a still-minimal (or miniscule) amount of mineral. Both recycling and mining require substantial private and public commitments of resources, but mining is absolutely terminal, whereas recycling can continue indefinitely.

These changes may render irrelevant a company’s claim that its mine is critical to the nation, because the cobalt it can contribute is both miniscule and contributing to a diminishing market. The mine that is promoted as a source of this mineral may become less relevant, and the mine’s economics may change, in response to these changes. Therefore, discussions about an individual mine’s relevance must include the possible boom and bust cycles that could impact its viability, much as booms and busts have governed mining over the centuries.

Conclusions

None of this suggests that critical minerals, such as rare earth metals, will become suddenly abundant and inexpensive, as aluminum became, but new discoveries/resources, recycling, and new/alternative technologies are rapidly changing how minerals are sourced and changing the demands on various minerals.

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From the Executive Director

As we are all too well aware, time often moves slowly, but it also moves relentlessly. The CSP2 Board has begun the process of finding the eventual replacement for me as executive director of CSP2.



*Dave Chambers is the
Executive Director of CSP²*

I have no plans, or desire, to retire. However, time is unlikely to honor my desire to continue working indefinitely, so a replacement is inevitable. I would like the transition to new leadership to be as smooth and productive as possible, so this is as good a time as any to begin that process.

The CSP2 Board has engaged a consultant, Marc Smiley of Solid Ground Consulting in Portland, to develop a business plan for the organization moving forward, and to manage the search for new executive director. The management focus for CSP2 moving forward will require some changes. I probably wear too many hats in the organization, from technical support to most management functions, and those tasks are probably better distributed over several people. It is unreasonable to ask one person to come in and assume all the roles I have gradually assumed over many years.

The redesigned CSP2 would have an enhanced technical review capacity, in which I would be the senior technical member; a Community Fund component that would provide funding to communities and tribal governments to pay technical service providers; and, would initiate the Society for Technical Environmental Professionals (STEP), a society to promote the professional development of the many technical professionals, like me, who have no professional home under existing professional organizations.

We want to proceed carefully with this process. Getting it right the first time is important for a small organization. We also want guidance from someone that has been through this before, hence our relationship with Solid Ground Consulting.

We will keep you informed as this process moves forward. If you have any questions, don’t hesitate to give me a call. I plan/hope to be around CSP2 for a while.

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