

POWER METAL: THE RACE FOR THE RESOURCES THAT WILL SHAPE THE FUTURE

By Vince Beiser

Reviewed by Cameron Catanzano

I. INTRODUCTION

Vince Beiser’s newest book—*Power Metal: The Race for the Resources That Will Shape the Future* (2024)—seeks to understand and wrestle with a growing tension in the fight against climate change: electrifying everything, and transitioning from fossil fuels, requires significant capacity for procuring and processing key metals.¹ Yet, this cornerstone of clean energy is anything but clean.

At 205-pages, *Power Metal* is a brief and effective crash course into the history, issues, and opportunities driving the fight for four metals in particular: copper, nickel, cobalt, and lithium.² For Beiser, the challenge is figuring out how to cheaply, and effectively satiate our hunger for these metals, while endeavoring to mitigate the environmental and human costs associated with their extraction and use. As Beiser explains:

The human race is facing a paradox: We must do everything we can to stave off the catastrophes of climate change, but, in doing so, we may create a whole other set of catastrophes.³

Readers familiar with Beiser’s previous work, *The World in a Grain: The Story of Sand and How It Transformed Civilization* (2018),⁴ will recognize his signature approach, merging the deep historical research of the “micro-history” sub-genre⁵ with the globe-trotting anecdotes of an award-winning reporter.

Power Metal falls within this vein but diverges from Beiser’s earlier work in two keyways. First, somewhat necessarily, *Power Metal*’s focus on multiple commodities, rather than on one, prevents it from establishing the level of comprehensive detail in a book like *The World in a Grain*. Second, by choosing to focus on what Beiser calls the “electro-digital age,” *Power Metal* works within a much shallower scope of history, placing a relatively greater emphasis on recent history, current events, and the cutting edge of possibilities.

1. See generally VINCE BEISER, *POWER METAL: THE RACE FOR THE RESOURCES THAT WILL SHAPE THE FUTURE* (2024).

2. From the book’s perspective, there are two metals that should be understood in two basic categories: the one that delivers our electricity (copper), and the three that store it (nickel, cobalt, and lithium). *Id.*

3. *Id.* at x.

4. In *The World in a Grain*, Beiser explores how a seemingly mundane resource like sand is the literal foundation of modern infrastructure. See generally VINCE BEISER, *THE WORLD IN A GRAIN: THE STORY OF SAND AND HOW IT TRANSFORMED CIVILIZATION* (2018).

5. For more on “micro-history sub-genre,” see Mark Kurlansky, *Salt: A World History* (2002).

II. THE ELECTRO-DIGITAL AGE

Readers of the *Energy Law Journal* will likely understand the demand for these metals as one driven by grid infrastructure, photovoltaics, battery energy storage, or electric vehicles. Beiser, however, pushes a broader scope of understanding—one that emphasizes both our *energy* transition and our *digital* revolution. It is not just the fight against climate change; it is the “electro-digital age.” To Beiser, this demand for metals is fueled by a much more comprehensive era in human development, encompassing three interconnected drivers: “digital technology and the internet; renewable energy; and electric vehicles.”⁶ This broader lens is crucial to understanding and evaluating *Power Metal*. For all the time spent discussing EV batteries or electric grids, there is as much emphasis on consumer electronics. This is especially true in the later sections, which deal with recycling and reuse.

Beiser’s decision to specifically name electric vehicles as a ‘driver’ of this age (rather than ‘electrification’ or ‘transportation’) is also important to note. Beiser’s introduction may cast a wide net on the topics to be discussed, but much of Beiser’s focus is on materials, supply chains, and demand for *batteries* – big ones and small ones. And it is EV batteries, specifically, that take center stage in Beiser’s final call to action, “The Road Forward and How to Travel It,” pushing to reform transportation and urban design in the developed world (mostly North America) to reduce dependence on personal automobiles.⁷

III. ELEMENTS OF THE FUTURE

After his introduction, Beiser’s first section, “Elements of the Future,” starts with an exploration of what makes these metals so useful, the geopolitical competition over mining and processing, and the complex, global supply chain that supports everything from cell phones to EV batteries. With the ground set, Beiser moves into a deeper exploration of cutting edge and controversial plans to expand where and how we extract these key metals.⁸

In all these chapters, the starkest example of human and environmental cost is in the so-called ‘artisanal’ cobalt mines of the Democratic Republic of Congo, where Beiser explores how the demand for smartphone and EV batteries has fuels nightmarish conditions, child labor, and poisoned ecosystems. To Beiser, the fact that electric cars are driving this surge for Congolese-cobalt also evokes the region’s brutal colonial past.

[Under King Leopold II,] Congo’s rubber went to feed the booming automobile-tire market, much as its copper and cobalt now feed the booming electric-automobile battery market.⁹

After describing the status quo, Beiser ends this section by exploring two controversial extraction methods that promise to leave a smaller environmental

6. BEISER, *supra* note 1, at 1.

7. *See id.* at 186.

8. *Id.* Copper, Nickel, Lithium, and Cobalt are Beiser’s primary focus; Copper being attributed (primarily) to the transmission of electricity, with Nickel, Lithium, and Cobalt being attributed to batteries.

9. *Id.* at 77

and social footprint: the extraction and evaporation of lithium brine in the Chilean desert and the push for deep-sea mining of polymetallic nodules. To Beiser, these methods clearly avoid the nightmarish conditions of a Congolese cobalt mine, yet the uncertainty of their environmental effects, and passionate opposition, must be carefully considered.

IV. THE REVERSE SUPPLY CHAIN

Perhaps one of the most interesting sections, and an advantage *Power Metals* has compared to competing books on mining and processing minerals, is Beiser's comprehensive discussion of global recycling. Instead of stripping metal from the earth, this reverse supply chain "mines" urban environments, collecting finished products (everything from cars to coffee makers), processing out the junk, and sending high-grade, refined metals off for manufacturing.

A chief focus point of Beiser's recycling research is his visit to "Ikeja marketplace" in Lagos, Nigeria. On one side of Ikeja, there are the "garbage pickers" risking their lives to salvage toxic e-waste. Yet, Ikeja is also home to driven entrepreneurs, employing teams of trained workers, meticulously extracting precious metals from Nigerians' old cell phones, and exporting them back out into a global metals supply chain.

To Beiser "urban mining" like this is a natural alternative to traditional methods of extraction, turning our hazardous trash into valuable treasure. Still, for Beiser, recycling is only a partial solution. The monetary and environmental cost expended shipping, processing, and refining these metals can be just as burdensome as mining them out of the ground. The better solution i for Beiser are the other two legs of the 'recycling' triangle: reuse and reduce.

V. BETTER THAN RECYCLING

In his final chapters, Beiser takes *Power Metal* into what could have been a very interesting and nuanced direction, taking on the forgotten siblings of the recycling triangle – reuse and reduce. The section began strong, with a "reuse" chapter, centering around the heroes and villains behind the United States' Right to Repair movement. In a codas to this chapter, Beiser then goes beyond consumer electronics, and profiles two "reuse" solutions in the world of energy: the repurposing of EV batteries for grid services, and the subsidized shipment of used solar panels to poorer, rural locals.

However, it was Beiser's closing chapter, "The Road Forward and How to Travel It," that left me unsatisfied. The previous 170-pages were interesting, extraordinarily detailed, and tied together with a coherent theme. In these last thirty-odd pages, Beiser makes arguments that I intuitively agree with, like the need for walkable, bikeable cities. His reframing of the race for critical minerals is also quite astute, "the real issue isn't how to get more metals into the global supply chain to build more cars, it's how to get people to where they want to go with fewer cars."¹⁰ Overall, however, his final chapter lacked the same level of detailed research and personalized reporting that I came to expect from Beiser.

10. BEISER, *supra* note 1, at 186.

There certainly could have been an interesting and coherent way to integrate a chapter like this into *Power Metal*. Profiling individuals or companies at the cutting edge of Beiser's vision for transportation would have given the chapter more human texture. For his call to action, however, it comes off as relatively underdeveloped.

VI. CONCLUSION

Despite its seemingly rushed ending, *Power Metal* is still a useful introduction to multiple important issues in the race for critical minerals. *Power Metal* is a worthy contribution to the library of anyone concerned with the future of energy policy, or simply wishing to understand the macro forces affecting our industry. At its best, Beiser's work serves as an essential reminder to move beyond black and white and reckon with the "dirty side" of clean energy.