Volt Rush: Critical Minerals & the New Energy Geopolitics

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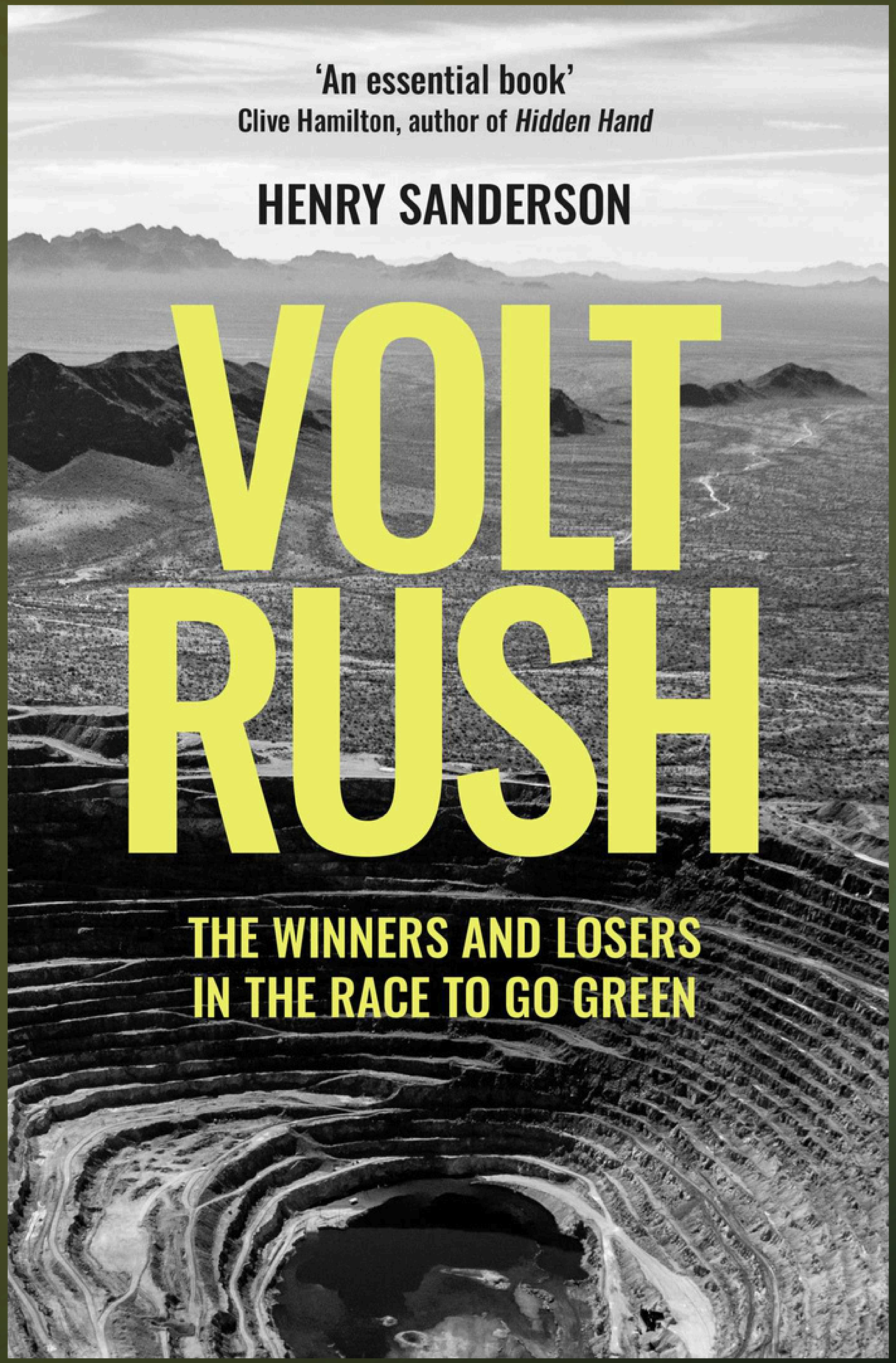


Parallels to the Hydrocarbon Revolution

“Those who control the resources we will need in vast quantities to avoid the catastrophic impact of climate change will be the new Rockefellers.“

“With almost every electric car in the world using nickel, a move by the biggest producer to cut off supply was reminiscent of the antics of Saudi Arabia and OPEC in the 1970s.“

“Despite talk of artificial intelligence, the internet of things, and an imminent takeover by robots, our societies have in many ways not moved on from the practices of the past, when the need for oil drove Europeans to carve up the Middle East.“

“The oil age has left a long scar on the twentieth century. We should make sure that the industries of our green future do much better.“

The Four Pillars of Volt Rush

1. Supply Chain Monopoly

Control of processing and refining, not just mines, determines who holds global leverage over EV production.

2. Critical Mineral Curse

Abundant resources don't guarantee local benefit; countries like DRC and Chile often bear environmental and social costs.

3. Historical Echo

The EV transition mirrors oil-era dynamics: concentrated markets, state-backed power, and OPEC-style influence persist.

4. Ethical Paradox

"Green" consumption in the West often externalizes harm to vulnerable communities and ecosystems abroad.

History of the Battery Age

Early Experiments (1900s - 1980s)

Henry Ford and Thomas Edison toyed with electric cars in the early 1900s, but cheap oil sidelined them until the 1970s oil crisis spurred pioneers like M. Stanley Whittingham and John Goodenough to develop the foundations of lithium-based batteries.

Commercial Breakthroughs (1990s - 2000s)

In 1991, Akira Yoshino and Sony commercialized the lithium-ion battery, unleashing a revolution in portable electronics that quietly set the stage for electric vehicles.

The New Battery Age (2010s - Present)

Elon Musk, often cast as a modern Henry Ford, used Tesla to mass-market EVs, forcing the mining and tech worlds into a new “battery age” defined by lithium, cobalt, nickel, and copper.

China & Supply Chain Dominance

Processing Hegemony

By controlling over 80% of global lithium refining and embedding itself across cobalt, nickel, and copper supply chains, China wields outsized influence over EV production, forcing automakers worldwide to depend on its midstream operations.

State-Backed Industrial Policy

Generous subsidies (≈$60B from 2009–2017), protectionist regulations, and mandatory joint ventures for foreign automakers created a structural environment that enabled companies like CATL to scale rapidly and dominate the global battery sector.

Tech & Innovation Scaling

Leveraging expertise from consumer electronics, aggressive R&D, and over 2,000 patents by 2019, Chinese firms mastered cost-efficient battery production at scale, driving down prices nearly 90% and setting the global standard for EV technology.

The Spice: Lithium

Australia

Pilbara Minerals and other producers shifted from iron ore to lithium in the mid-2010s, fueling a mining boom tied closely to Chinese demand, though overexpansion later caused prices to collapse.

Chile

The Atacama Desert holds vast lithium reserves controlled by SQM, where privatization-era wealth and Chinese investment highlight tensions between national sovereignty and global supply chain pressures.

Mexico

Ganfeng’s acquisition of Bacanora Lithium exemplifies China’s strategic expansion into North America, securing proximity to U.S. markets while avoiding political scrutiny.

The Spice: Cobalt

Democratic Republic of Congo (DRC)

Produces over 60% of global cobalt, where industrial and artisanal mining coexist amid corruption, child labor, and elite capture, making the nation the chokepoint of the EV revolution.

China

Through companies like Huayou Cobalt, China dominates downstream processing and leverages cobalt supply chains, often sourcing from the DRC while facing less scrutiny than Western buyers.

The West (Europe, USA)

Highlighted indirectly - Western automakers like Volkswagen and Tesla depend on DRC cobalt and Chinese intermediaries, exposing strategic vulnerabilities and ethical dilemmas in securing clean energy minerals.

The Spice: Nickel

Indonesia

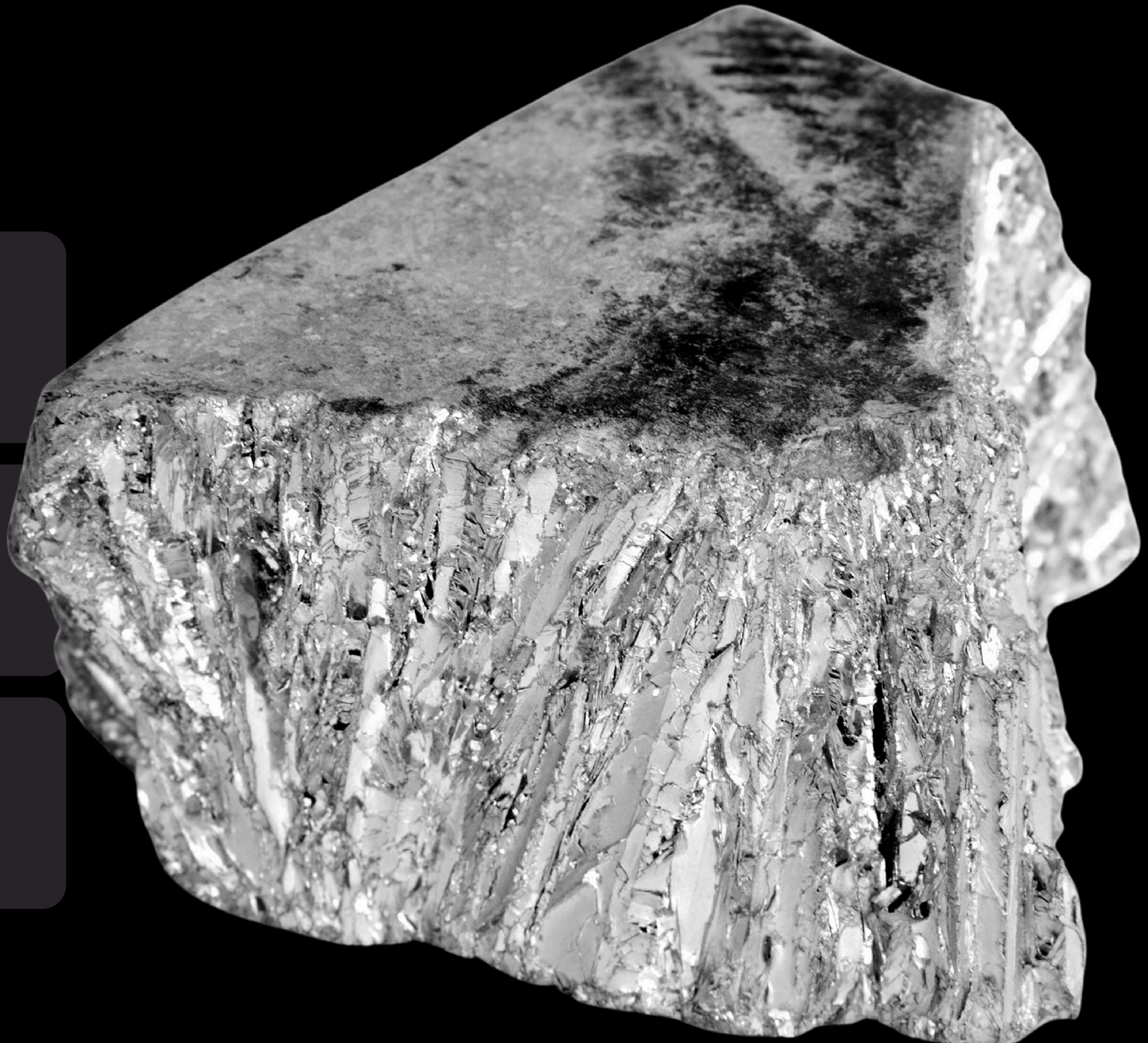
Largest nickel producer; domestic ore bans and Chinese-backed industrial parks (Morowali) concentrate supply and power Tsingshan's dominance, often causing severe environmental damage.

China

Through state-backed firms like Tsingshan and China Metallurgical Group, China controls processing, pricing, and global supply chain integration for nickel.

Papua New Guinea

Ramu mine demonstrates the ecological costs of nickel extraction - ocean contamination, dead marine life, and disrupted local communities.



The Spice: Copper

Democratic Republic of Congo (DRC)

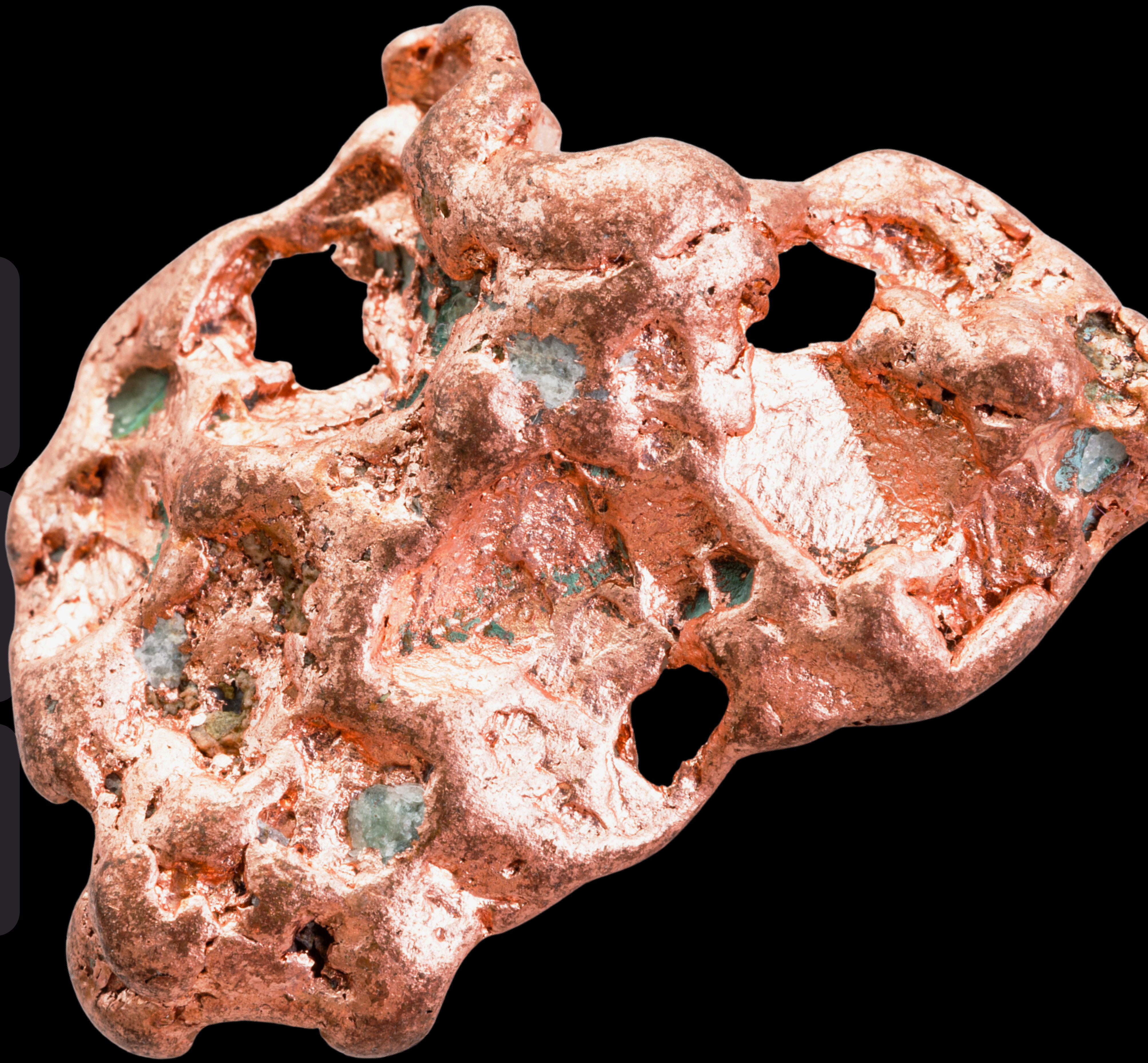
Home to the high-grade Kamoa-Kakula and Tenke Fungurume mines; central to Friedland's deals and China's overseas acquisitions.

Peru

Location of Las Bambas, a major copper asset secured by Chinese firms, illustrating overseas resource expansion.

China

Controls ~50% of global copper consumption while producing only ~8% domestically, consolidating influence through state-backed acquisitions and trading infrastructure.



Circular Economy

Recycling & Re-Use

Companies like Redwood Materials aim to reclaim 95–98% of lithium, cobalt, and nickel from spent batteries, turning waste into a domestic resource and reducing dependence on foreign supply chains.

Second-Life Batteries

EV batteries can power retrofitted cars, boats, and energy storage systems, extending lifespan and delaying new extraction.

Limitations & Paradox

Despite the promise, global material demand outpaces recycling efforts, meaning mining remains central for decades while circular strategies mainly buy time and build supply resilience.

Takeaways

Critical minerals are the new levers of global power, and control over processing and supply chains can outweigh mere resource abundance.

The green transition isn’t inherently “clean”: environmental harm, labor exploitation, and ethical dilemmas persist at every step.

Early strategic vision - whether through state policy, entrepreneurship, or industrial know-how - determines who wins in emerging energy markets.

Efforts toward recycling, domestic supply chains, and green innovation reduce dependence, but the transition remains complex, uneven, and globally entangled.

The Future of the Energy Transition

The energy transition is a story still in the making. Europe and the UK are attempting to reclaim industrial sovereignty through projects like Northvolt and Cornwall Lithium, combining green industrial policy with domestic resource ambitions. At the same time, new sources such as deep-sea nodules and geothermal lithium promise alternatives but carry uncertain environmental and ethical risks. Despite these efforts, global clean energy remains tethered to geopolitically complex mineral supply chains, meaning the “green revolution” will continue to navigate trade-offs between ambition, sustainability, and dependence.