



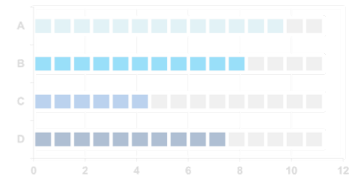
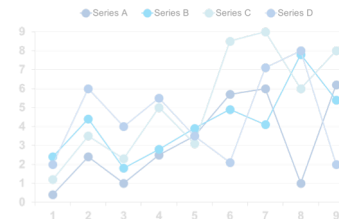
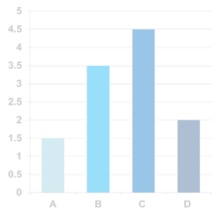
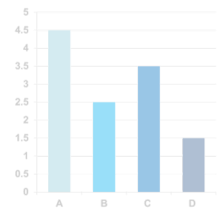
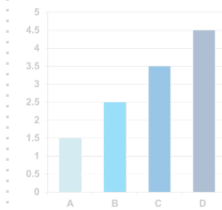
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RESEARCH

SAMPLE

INSIGHT REPORT

Water for Mining: Market Trends and Forecasts, 2023–2030

July 2023



Water for Mining Drivers & Inhibitors

Mining is a focal point in the energy transition, with demand for metals like copper, lithium, tin, and zinc climbing in recent years. Geopolitical tensions have fueled a shift in global supply chains, resulting in a myriad of impacts on the mining sector.

Challenges



Water Scarcity

Droughts have led companies to scale back mining production in water-stressed areas (e.g., western U.S., Chile). Companies operating in areas of high water scarcity face reputational risks and risk losing their social license to operate.



Environmental Risks

Wastewater and runoff from mining facilities can contain toxic heavy metals and radioactive waste. Tighter environmental regulations on discharge can be a challenging constraint for mining operations.



Regulatory Bottlenecks

Central governments can hamper mining productivity or implement export bans. For example, in Zambia during periods of limited electric generation, electricity to industries can be rationed.



Geopolitical Risk

Geopolitical tensions, social unrest, and resource nationalism within a country can force mines to cease operations or operate at partial capacity. Instability in countries like Peru is estimated to impact 30% of Peruvian copper production. Contentious land-right issues can also occur in areas with local Indigenous communities.

Drivers



Growing Demand from Energy Transition

As a result of increased reliance on advanced technology in the world's decarbonization effort, the need is soaring for green metals that are crucial components of electric vehicles, solar panels, and other green technologies.



Regulatory Landscape

Incentivizing policies from governments (e.g., the U.S. Bipartisan Infrastructure Law) promote expansion of mining facilities in leading geographies—U.S. and eastern Asia. Countries looking to create their own downstream domestic employment opportunities may heavily tax or ban raw mineral exports.



Commodity Prices

Mining activity is ultimately driven by the market's demand for a commodity. Cash flows for producers can benefit or suffer depending on commodity prices.



Economic Growth

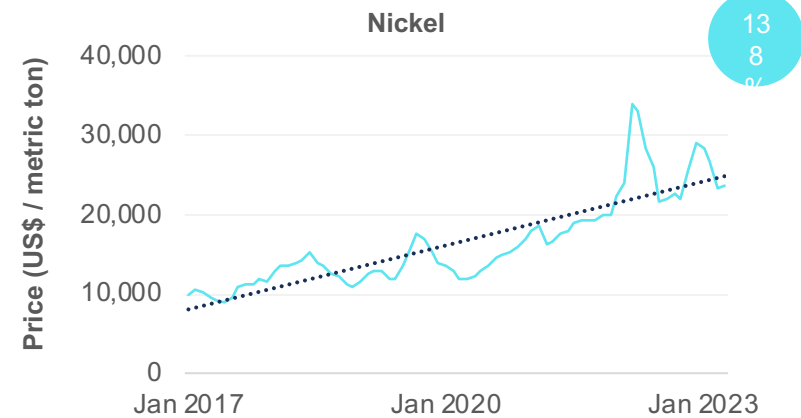
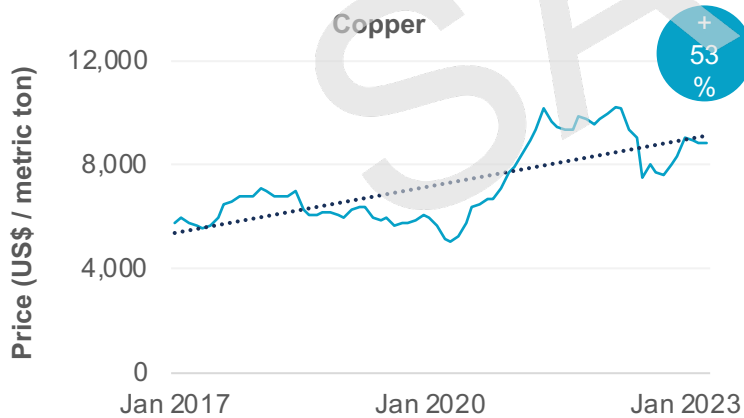
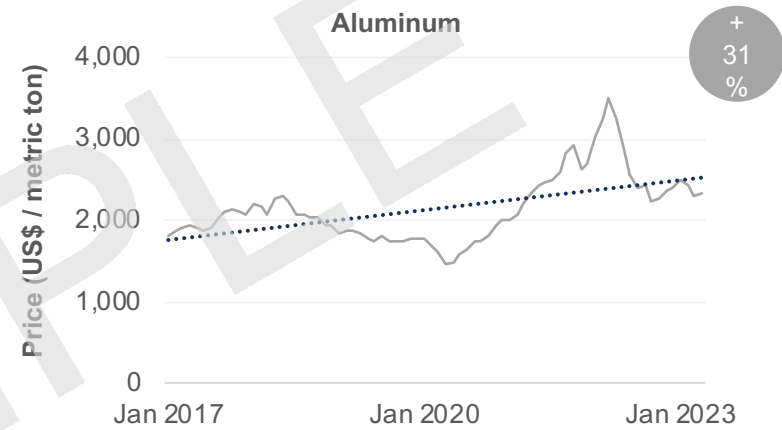
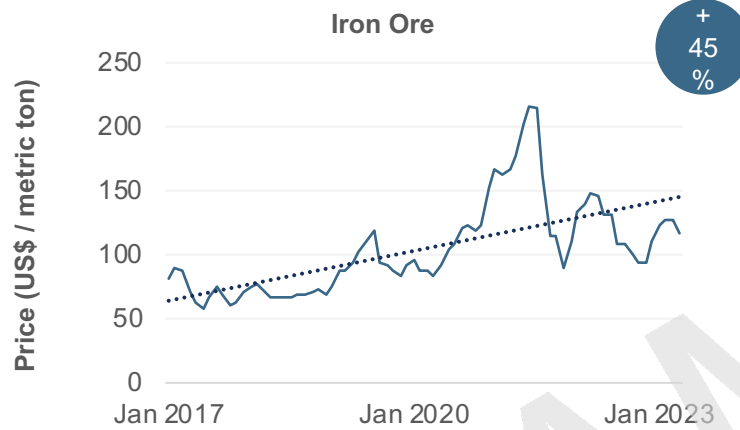
A variety of modern industries require mineral input. For example, construction requires copper and aluminum, placing greater demands on suppliers as countries around the world develop.

Source: Bluefield Research

Commodity Prices Trending Upward

From 2017 to 2023, commodity prices for iron ore, copper, and aluminum climbed by more than 35%. According to the IMF, cobalt, lithium, and nickel prices are forecasted to rise by several hundred percent between 2020 and 2030 to support growing energy-transition demand.

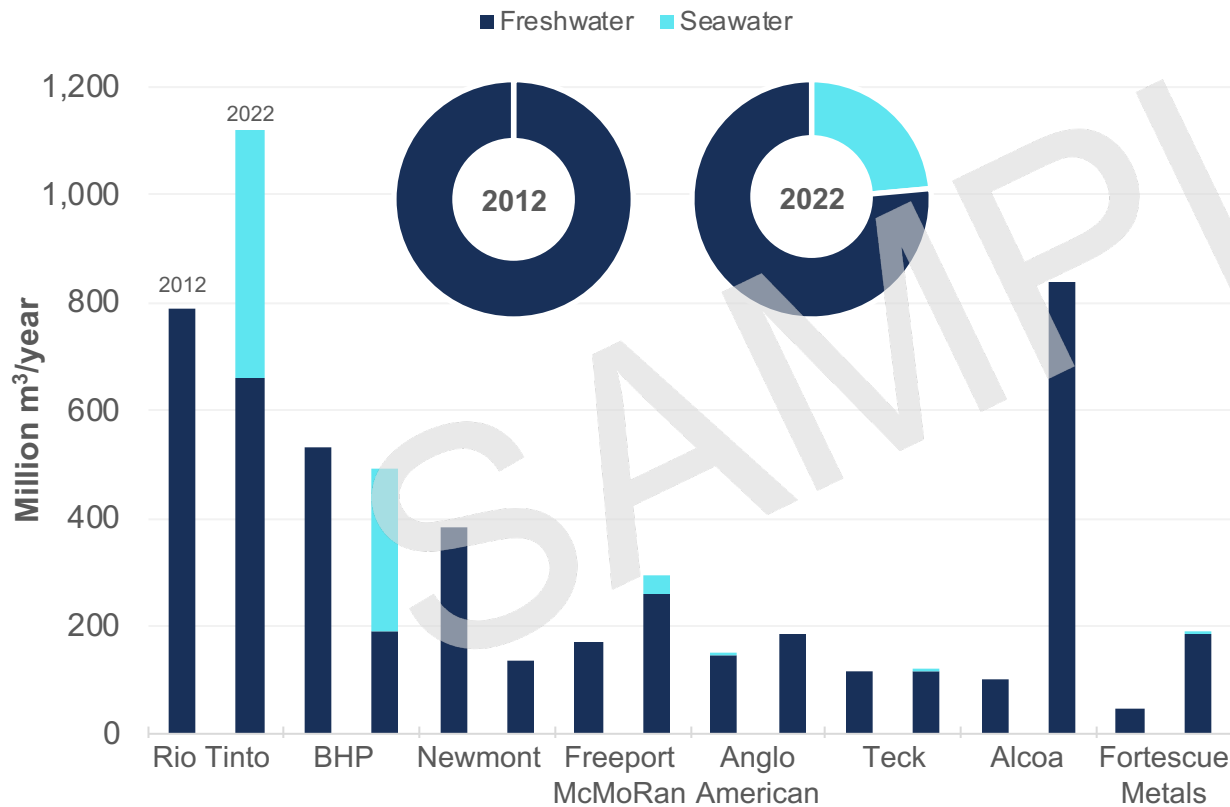
Mineral Commodity Prices



Mining Sector Sways Away from Freshwater

Primarily due to the rise of desalination and concerns surrounding freshwater scarcity, leading companies are increasingly reliant on seawater for operations.

Water Withdrawals by Source, 2012 vs. 2022



Analysis

Political and popular pushback on the mining sector’s impact on freshwater resources has led to a search for alternative water sources (e.g, saltwater).

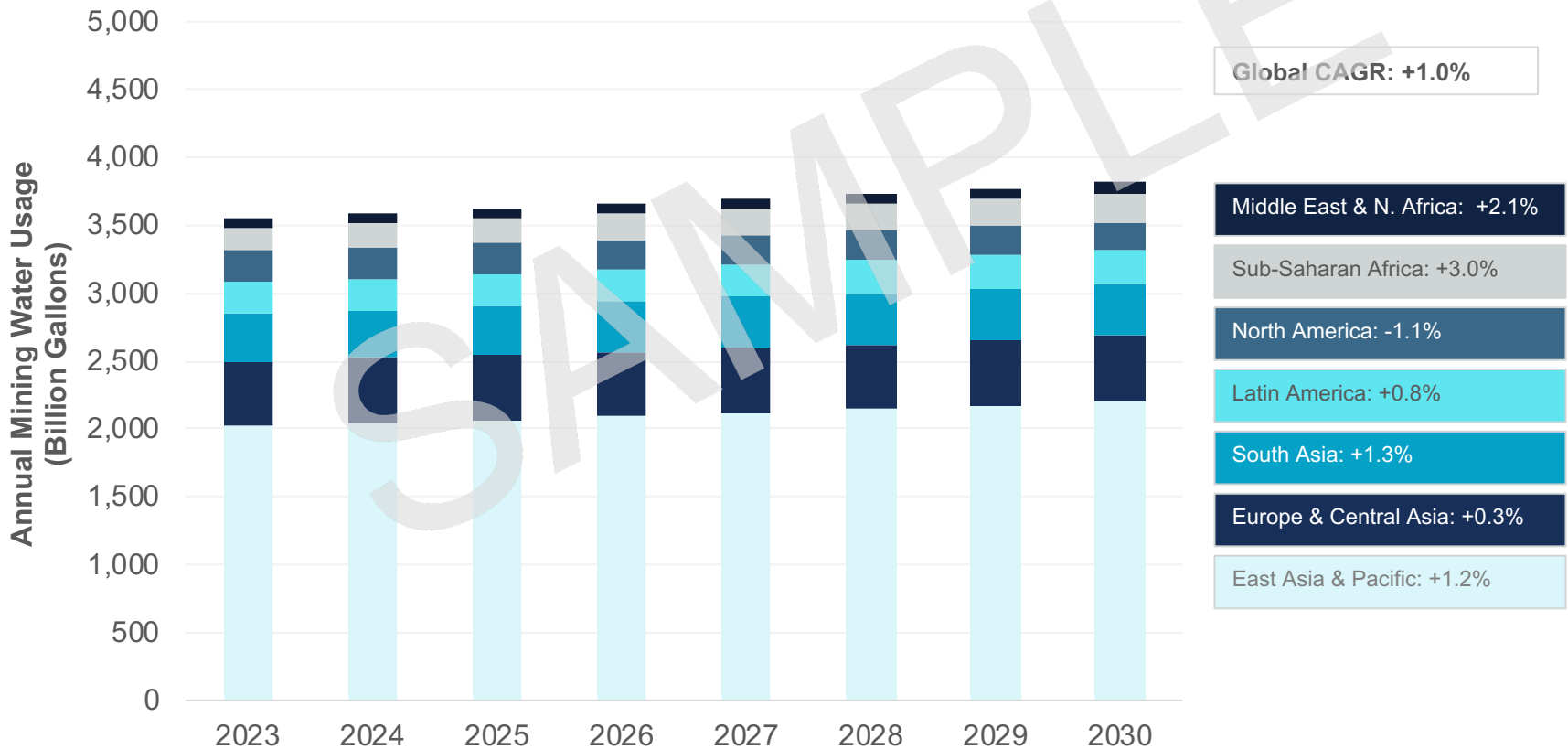
- Of the eight mining companies analyzed, Rio Tinto, BHP, and Freeport McMoRan all implemented significant saltwater usage in their operations between 2012 and 2022.
- The remoteness of mining operations often limits the availability of freshwater, especially municipal water. Therefore, augmenting water availability is primarily achieved through saltwater desalination and water recycling.
- Cumulatively, the share of saltwater usage between the eight companies increased from .01% to 24.00% of water withdrawals.
- Seawater desalination has become more mainstream as the availability of reverse osmosis systems has scaled.
- In addition to the rise of desalination, some operators are using raw seawater to process certain ores and directly as cooling.

Source: Bluefield Research

Year-over-Year Water Usage by Region

Bluefield projects a CAGR of 1.0% between 2023 and 2030 in total water usage for mining. Mining activity is ramping up in Africa—and an informal regulatory landscape combined with new projects accelerates the forecasted water usage in the region.

Water Usage by Region



Source: Bluefield Research