



COULD COPPER BE THE NEW OIL?



Bernard Chua, CFA
Senior Client Portfolio Manager

We think demand for the industrial metal will grow for decades. That creates investment opportunities, but there are environmental and social consequences.

COPPER: WHAT YOU SHOULD KNOW

We believe copper will have a profound effect on the global economy throughout this century.

Like oil in the 20th century, copper is central to transformative technology that shapes the way we live and work. The investment implications go well beyond mining and converting ore into industrial metal. Copper's pricing and availability are crucial to the operations and profitability of a wide range of companies. This includes businesses tied to such prominent investment themes as electrifying vehicles, generating clean energy and rebuilding the electrical grid.



Copper is a critical input in many industries.

Copper is widely used, and it's a crucial raw material for companies involved in electrification, renewable energy, infrastructure, and information technology.



Supply is limited, but demand is growing.

Soaring usage projections and supply constraints could drive prices higher.



Sustainability implications are complex.

Though copper is crucial to a carbon-neutral future, the environmental and social impacts of current mining techniques remain a major concern.

COPPER IS WIDELY USED

Silver and aluminum are the only viable alternatives to copper for electrical conductivity. Silver is more expensive—by a factor of five or six. Aluminum is cheaper and lighter, but copper is a much more effective conductor and remains the metal of choice.

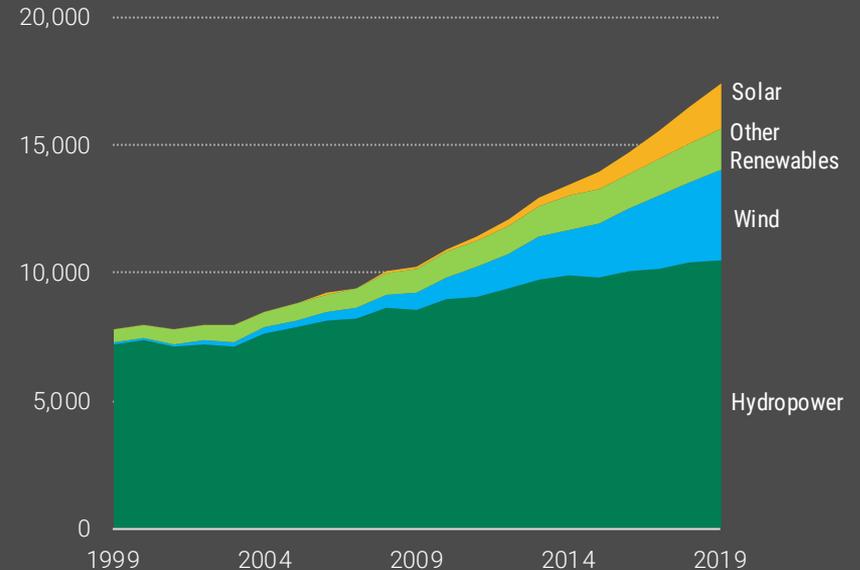
Where Is Copper Used?

Renewable Energy Copper is vital to wind turbines and photovoltaic cells, as well as generators, transformers and copper coils in thermal and hydroelectric power. Figure 1 shows the significant growth of renewable energy consumption over the past 20 years.

Electrification Electric vehicles and trains are proliferating as the world transitions to cleaner transportation. Copper is key to batteries, electrical systems, computer chips and charging facilities.

Infrastructure Copper wire is used in rebuilding electrical infrastructure. President Joe Biden's infrastructure package includes major upgrades to the electrical grid as well as programs to improve connectivity and digitalization.

Figure 1 | Renewable Energy Consumption
In Terawatt-Hours



Data from 1/1/1999 to 12/31/2019.
Source: Vaclav Smil and BP Statistical Review of World Energy.

DEMAND IS GROWING, SUPPLY IS LIMITED

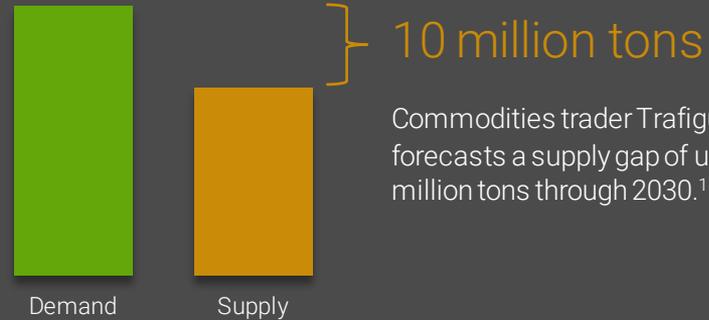
Copper is a finite natural resource. Current reserves are somewhat plentiful, but they could be depleted quickly given the rapid pace of green energy initiatives.

Demand Drivers

- Government regulations and demand for renewable energy are accelerating the conversion to green technology.
- International accords and corporate net-zero initiatives are driving demand for clean solutions.

Supply Constraints

- Accessing new copper sources deep in the earth or under the ocean is difficult.
- Current commodity prices are not adequate to spur investment in new mining projects.
- Conventional mining techniques create pollution and sometimes disrupt indigenous communities.
- Potential geopolitical tension can threaten access to mines.



COPPER'S SUSTAINABILITY ISSUES

The Good News

Copper is vital to a green energy and reduced carbon future. Wind turbines, electric vehicles and trains, solar cells, hydroelectric plants and copper wire are essential to meeting global net-zero goals.

The Bad News

Environmental and indigenous groups have opposed new exploration and production, citing ecological disruption and damage to historically significant sites.

Trade-Offs

Investors must navigate between achieving low-carbon goals while mitigating the ESG risks of mining operations.



NAVIGATING THE TRADE-OFFS

Our approach to sustainable investing encompasses three broad areas.

1. **Environmental, social and governance (ESG) issues.** We believe that evaluating a company's ESG characteristics can help us identify downside risks or upside potential that may not otherwise be captured by traditional financial analysis.
2. **Active ownership.** As long-term investors, voting shares in the best interest of clients is an integral part of our investment process and commitment to serving clients.
3. **Engagement.** We seek to have constructive dialogues with companies to gain a more thorough understanding of a company's approach to ESG and encourage a company's increased transparency around material ESG issues.

When portfolio managers incorporate Environmental, Social and Governance (ESG) factors into an investment strategy, they consider those issues in conjunction with traditional financial analysis. When selecting investments, portfolio managers incorporate ESG factors into the portfolio's existing asset class, time horizon, and objectives. Therefore, ESG factors may limit the investment opportunities available, and the portfolio may perform differently than those that do not incorporate ESG factors. Portfolio managers have ultimate discretion in how ESG issues may impact a portfolio's holdings, and depending on their analysis, investment decisions may not be affected by ESG factors.

An investment strategy that integrates Environmental, Social and Governance ("ESG") factors aims to make investment decisions through the analysis of ESG factors alongside other financial variables in an effort to deliver superior, long-term, risk-adjusted returns. The degree to which ESG integration impacts a portfolio's holdings may vary based on the portfolio manager's materiality assessment. Therefore, ESG factors may limit the investment opportunities available, and the portfolio may perform differently than those that do not incorporate ESG factors. Portfolio managers have ultimate discretion in how ESG issues may impact a portfolio's holdings, and depending on their analysis, investment decisions may not be affected by ESG factors.

CASE STUDIES

Rio Tinto (Australia)

Rio Tinto is a global metals and mining company with headquarters in Melbourne and London.

- Local indigenous groups' opposition to projects in Arizona, Guinea, Quebec and Western Australia have landed the company on the U.N. Global Compact's watch list.
- Our engagement with management has spurred mediation with local groups and reaped a commitment to improving business operations' carbon, energy and water intensities.

Grupo Mexico (Mexico)

Grupo Mexico is a global mining, transportation and infrastructure company with headquarters in Mexico City.

- The company faces community opposition to its Peru project due to a sulfuric acid spill and ongoing labor disputes.
- Governance concerns will remain until management improves relations with its unions and employees.
- The company has improved its relationships with local communities and taken steps to clean up the water supply.

END NOTES

¹ Nick Snowdon, "Copper is the New Oil," Goldman Sachs, May 18, 2021.

² James Attwood, "The World Will Need 10 Million Tons More Copper to Meet Demand," Bloomberg, March 19, 2021.

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