



The Mining Industry

How to Fuel the Green Energy Supply Chain Sustainably

Key Takeaways

- Mining companies are large emitters, however they are essential in securing the energy transition.
- A huge amount of investment is required to both meet increasing metal demand and ensure it is done sustainably.
- A range of infrastructure solutions are available to sustainably secure energy and water supply: desalination and produced water treatment, and on-site renewables and storage.
- Resonance is committed to assisting mining companies with their integral role in the clean energy transition, reducing their environmental impact through providing financing and technical solutions.

Industrial Metals -The Source of Electric Vehicles, Wind Turbines & the Grid Itself

Electrification to decarbonise transportation and power is fuelling demand for industrial metals. Copper, steel, aluminium, lithium, graphite, cobalt and other rare earth elements are crucial to the green energy transition. All of these materials are needed for a range of products from lithium-ion batteries to wind turbine components. Copper demand alone is expected to grow by 31% by 2031 (relative to 2020 data)¹. With increasing demand, supply constraints, and sustainability pressures mines are having to adapt.

The future net zero emission economy will depend on huge increases in electricity supply and demand, rising by between 75% and 150% between 2022 and 2050²



Sustainability Concerns

Mining companies are critical in the transition to net-zero but they sit on both sides of the equation. They produce the materials needed to create sustainable infrastructure, but also are responsible for a large portion of global emissions in the process.

Mining and mineral processing consumes over 8% of the world's total energy and contributes 10% of all greenhouse gas emissions³

They also produce a lot of pollution, from contaminated wastewater and tailing ponds to using diesel generators for power generation.



Mining Challenges

Mines are under increasing pressure from investors and consumers to produce materials responsibly and sustainably... all while needing to ramp up production to meet the growing demand.

Besides the sustainability pressures, mines require large amounts of energy, chemicals, and water to operate, often in remote and arid regions that are increasingly water-stressed due to increasing population, industry, and climate change. As a result, mines make extensive use of on-site diesel generators and transported water using tankers or extensive pipelines, neither of which is sustainable nor cheap.

¹ McKinsey, 2023

² International Energy Agency (IEA), 2022

³ International Energy Agency (IEA), 2022



Investing in Sustainable Mining

To overcome these mining challenges, Resonance looks to invest in asset solutions that reduce the environmental footprint of new and existing mines, and ultimately reduce costs.

The following solutions reduce its environmental impact and achieve operational cost savings due to efficiency gains:

- Desalination and renewable onsite energy allow exploration in water and energy-scarce locations.
- Water recycling and treatment systems on-site reduce the water stress and pollution in local areas.
- Renewable energy sources like solar panels can reduce dependency on fossil fuels, especially in the often high-solar irradiance areas.
- Advanced treatment facilities with the ability to recover precious metals reduce waste and intensity of extraction.



Case Study: Linear to Circular Mining

In Europe, concerns over the supply of precious raw materials and the quantity of water consumed by the mining sector are acute.⁴

An R&D project led by Cetaqua, a water technology company, financed by the LIFE Programme of the European Commission aimed to advance the transition of the bloc towards circular business models.

As a linear, extractive process, finding ways to reduce the impact of mining on the environment was the key objective.



Source: LIFE Remine Diagram taken from informational video on the company website

Life Remine Water made it possible to recover 90% of wastewater for reuse, recovering 90% of the copper and

⁴News, Remine Water EU October 2023, Website access December 2023

⁵ Remine Water, Website access December 2023

50% of the zinc present in the influent. The process is powered by solar energy produced on-site, reducing the emissions of the plant by 70%.⁵

The technology requires scaling to be deployed for industrial use, but it demonstrates the possibilities for effective treatment of acidic wastewater. The project was technically and economically viable, achieving a 50% OPEX reduction compared to conventional brine treatment technologies.



Case Study: Green Gold

In 2021, the off-grid Agnew Gold Mine, located in Australia, undertook a project involving the implementation of a renewable microgrid, featuring wind turbines, solar panels, and battery storage.

This infrastructure allows the mine to meet 60% of its energy demand from renewables, contributing to a more environmentally friendly and cost-effective energy solution with the backing of the Australian Renewable Energy Agency (ARENA)⁶. A total of 18 MW of wind turbines and 4 MW of solar have been installed near the mine.



The 4 MW of solar panels and associated storage at Agnew Gold Mine⁷

The Agnew Gold Mine's commitment to renewable energy reflects a broader trend within the mining industry, showcasing how strategic investments in green infrastructure can lead to a more sustainable and cost-effective approach to mining operations, especially in remote areas like Western Australia.

⁶ ARENA 2022, Website access, December 2023

⁷ Mining Technology, Website access, December 2023



Looking Ahead

The mining industry plays a crucial but dual role in the global transition to a net-zero emission economy. While it provides essential materials for sustainable infrastructure, mining operations also contribute significantly to global emissions and face sustainability challenges.

Resonance recognises the pivotal position of mining companies in the clean energy transition and aims to

address these challenges through strategic investments in sustainable solutions.

The commitment to financing and providing technical solutions underscores the need for large-scale investments to meet increasing metal demand sustainably. The identified infrastructure solutions, including desalination, renewable energy sources, and water recycling, demonstrate a practical approach to mitigate the environmental impact of mining operations.

Get in Touch

Ekaterina Barker-Privalova, Investment Analyst
ebarker-privalova@resonance.fund

Daniel Vizard-Williams, Investment Analyst
dwilliams@resonance.fund

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