

# PHASING IN ELECTRIFICATION

**A phased approach can help mining companies decarbonise their operations on the road to net zero, as Mehrzad Ashnagaran explains**

The transition from energy-intensive, emissions-heavy mines powered by fossil fuels to all-electric operations is well under way. Fully integrated projects connect the mine to the process area, allowing for complete continuity from pit to port, and facilitate innovations such as remote monitoring and predictive maintenance.

ABB provides complete plant electrification and automation systems,



**ABB eMine trolley system, with overhead catenary system and DC substation shown at Copper Mountain Mine.** Image courtesy of Copper Mountain Mining

integrated process optimisation solutions, power distribution, motors and drives, as well as instrumentation systems for underground mining, open pit mining and mineral processing. Its five-step approach to mine electrification is built around a holistic view of mine projects, where technologies are not deployed in isolation, but rather as part of a strategic roadmap to plant decarbonisation and electrification.

## INVOLVE THE RIGHT PARTNERS

Mining companies know that transitioning to all-electric operations is challenging and depends on numerous factors, including location and available energy sources. By working with technology innovators such as ABB, they draw on decades of

electrification knowledge and experience with the world's mines and mineral processing plants. Strong local and global engineering, manufacturing and service presence is readily available to understand and effectively support mining strategy.

In Canada, Copper Mountain Mining looked to ABB and leveraged real-world experience of electrifying a mine site to overcome its challenge to reduce carbon intensity by more than 50% in the medium term and eventually reach its zero emissions. The installation, which includes engineering, supply and construction management for a DC substation and an overhead catenary system (OCS), combines ABB's electrification and automation expertise.

ABB Ability MineOptimize is a four-pillar framework that integrates individual mining solutions into a secure and structured plant-wide system. It accesses all of ABB's engineering capabilities, system solutions, digital applications and collaborative services for the mining industry. At the Copper Mountain Mine, ABB brought in this expertise and aligned it with its eMine electrification and automation methodology, which sits under MineOptimize and is currently focused on transitioning mine haul trucks from diesel to electric.

## COLLABORATE TO INNOVATE

Working with others on electrification, eMine FastCharge is part of Charge On Innovation Challenge, a global initiative facilitated by Austmine, BHP, GHD, Rio

**ABB Ability eMine technologies can be controlled centrally away from the mine site**

Tinto and Vale and aimed at commercialising charging solutions for large electric haul trucks. In 2022, ABB was selected as one of eight winning innovators from more than 350 entrants, a group that has now moved on to collaborate with mining companies, OEMs and innovators to accelerate the technology development to support the future roll-out of zero-emissions fleets.

Devising open communication standards means that both mobile (and fixed) assets from different vendors can be integrated, enabling mine customers to gather data on the location and charging status of every vehicle throughout the enterprise – on a single platform and in real time.

ABB is also a founding member of the CharIN Mining Taskforce, a partnership between global organisations CharIN and ICMM, which has BHP, GHD, Rio Tinto and Shell among its participants. The partnership enables ICMM to address technical bottlenecks around the interoperability of battery-electric charging systems for the roll-out of zero greenhouse gas (GHG) emission mining vehicles. Furthermore, ABB has set about its own mission to promote ongoing joint development and co-creation directly with mining operators, OEMs and technology innovators to drive progress in this space this decade.



Charging infrastructure in the mine can be monitored, controlled and recorded via tablet

## FUTURE-FACING MINE DESIGN

Standardisation also has an important role, where all assets – from the grinding systems to power distribution – are fully connected. New approaches to mine design must take into account all ongoing developments in electrification to ensure they are fit for the future. This is of particular importance when you consider that mines are very energy intensive and require 24/7-365 access to a constant, reliable supply of renewable power, directly from the grid or on-site. Ensuring that power is integrated with power management and energy storage systems is vital.

Engaging with a trusted technology vendor early in the project life cycle ensures that subsequent solutions are tailored to a customer's individual needs. It also allows ABB to leverage its power management expertise to provide operators with a complete integrated electrification solution, beginning with reliable connection to the grid.

## MEET SPECIFIC MINE REQUIREMENTS

Step four in ABB's phased, five-step approach to mine electrification is investment to address the needs of the individual mine. As we have seen, innovations such as fast charging infrastructure and electric trolley systems will drive electrified mining forward. However, custom electrification solutions can also be tailored to align with a mine site's efficiency targets – significantly reducing energy costs as well as the overall environmental impact of a site.

Back at the Copper Mountain Mine, the customer recently reported that the ABB eMine Trolley System, which is connected



**Panorama of the Copper Mountain site near Princeton, British Columbia, Canada.** Image courtesy of Copper Mountain Mining

to the ABB Ability System 800xA distributed control system (DCS), has cut carbon emissions by 90% on the trolley segment, contributing to Copper Mountain's ultimate goal of net-zero emissions by 2035.

## LIFECYCLE MANAGEMENT

Lifecycle management of equipment ensures maximum availability and that a mine's technologies and production processes address environmental challenges, from installation to decommissioning. This can be achieved using remote monitoring to keep production up and running and advanced digital mining services to enable informed decision-making based on asset and operational data.

In addition, remote services, predictive maintenance, and upgrades and retrofits can all help mining companies ensure maximum performance and return on investment throughout the mine's lifecycle. ●

Mehrzad Ashnagaran is with ABB. [www.abb.com](http://www.abb.com)