



Digitalization and Electrification to Address Mining Challenges

Max Luedtke of ABB explains how a coherent electrification strategy, coupled with investment in digital technologies, can help operators improve sustainability and create new business models

With each passing year, the vision of the integrated all-electric mine, one that maximizes energy and resource consumption for more efficient, sustainable operations, gets closer to becoming a reality.

The latest "State of Play: Electrification" report from global management consultancy VCI¹ echoes this view: 89% of the industry executives surveyed expect mine sites will electrify in the next 20 years, while 61% — almost two-thirds of respondents — expect the next generation of mines will be all electric.

Establish an Electrification Vision

Every operator is at a different stage in their electrification journey, of course, but one thing is for sure, the transition is irreversible and those that fail to innovate and invest risk losing a competitive advantage. However, technology is nothing without vision and context. What do I mean by that?

Well, increasing numbers of mining customers are asking ABB for open-standard, vendor-agnostic technology solutions — developed collaboratively with technical suppliers and original equipment manufacturers (OEMs) — that evolve as the customer's needs change, offering improved flexibility, value for money and return on investment.

An example of this is the pilot technology ABB Ability eMine FastCharge, part of the new ABB Ability eMine portfolio² unveiled at MINExpo. This is a fully automated charging system offering up to 600 kilowatts (kW) of

power. We are working closely with OEMs, Stäubli and MEDATech, to ensure the requisite infrastructure is in place so the industry can enjoy the full benefits now and, in the future, electrify a range of equipment, from drills and excavators to loaders.

Overall, eMine comprises a portfolio of electrification technologies that makes the all-electric mine possible from mine to port and is integrated with digital applications and services to monitor and optimize energy usage. It can electrify any mining equipment across hoisting, grinding, hauling and material handling. It is backed by integral design planning and thinking to maximize the value of electrification to reduce overall costs and improve mine performance while significantly lowering environmental impact.

Powering Sustainable Operations

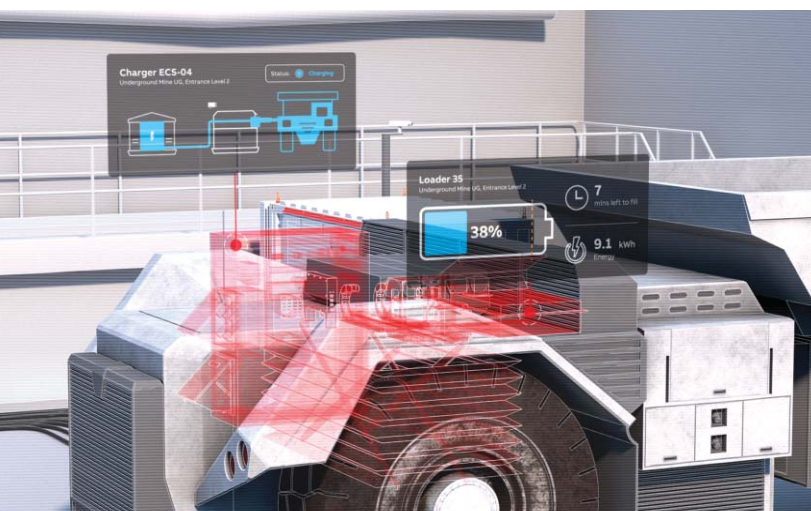
Electrification requires miners to adopt new technologies and working practices, as well as address challenges around planning, fleet management and skill sets. It is therefore important that they engage with a trusted technology provider early in the project life cycle to establish a long-term vision, and then break that down into tangible work packages in partnership with domain experts.

Nowhere is this more important than in the area of sustainability. Mining is responsible for 4%-7% of global greenhouse gas emissions³, with a significant amount from diesel trucks. At MINExpo, nearly every truck was equipped with trolley capability, and this transition to hybrid vehicles with an onboard electrical system will continue to significantly reduce CO₂ emissions and improve fuel economy.

An example of this is ABB's partnership with Copper Mountain Mining to provide a complete haul truck, trolley-assist solution for its Copper Mountain mine near Princeton, British Columbia, Canada.

In this instance, ABB is dealing with the end user. This ties in with my earlier point about collaboration and working models. If future retrofitting takes place at Copper Mountain, or an OEM supplies new hybrid trucks, ABB can provide a complete integrated solution.

It is estimated that the initial phase of the trolley-assist system will reduce carbon emissions at the site by up to 7%. The goal is a 50% reduction in CO₂ in the next five to seven years, as well as improved efficiency and fuel consumption.



A vision of the pilot ABB Ability eMine FastCharge with a truck charging.



ABB Ability eMine is integrated with digital applications and services to monitor and optimize energy usage.

New Business Models

Electrification will also create opportunities for new business models around the use of green hydrogen and energy storage, with the potential for mining companies to create additional revenue streams by selling stored power back to the grid. This will become more important as electricity grids become more complex thanks to the influx of renewables such as wind and solar PV, and as power supplies that are erratic in terms of demand, such as electric vehicles, are connected to the network.

We are already seeing this happening in areas such as Australia, Scandinavia, northern Europe and

North America, where renewable energy infrastructure and provision are more mature.

One final takeaway from the VCI report: 98% of survey respondents believe mine automation is the technology that will benefit the most from electrification. I concur, and to that I would also stress the importance of digitalization. That is why ABB's approach to mine electrification is built around those three pillars: electrification, digitalization and automation. What are the design requirements of electrified mines? Do they require centralized storage? What are the optimum grid solutions and how can they incorporate the flexible loading of mobile equipment and integration of renewables?

ABB Ability eMine is a framework that comprises electrification technologies integrated with digital applications and services to optimize energy usage, and can provide answers to these questions and more, helping operators improve efficiency and sustainability, and make the vision of the all-electric mine a reality.

References

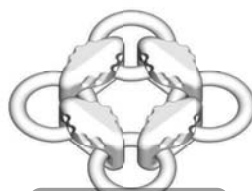
- ¹ *State of Play: Electrification – VCI report provided by ABB.*
- ² <https://new.abb.com/news/detail/82055/abb-unveils-game-changing-abb-ability-emine-to-fast-track-transition-to-all-electric-mines>.
- ³ www.mckinsey.com/business-functions/sustainability/our-insights/climate-risk-and-decarbonization-what-every-mining-ceo-needs-to-know.



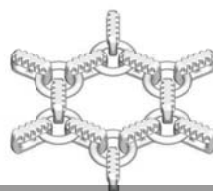
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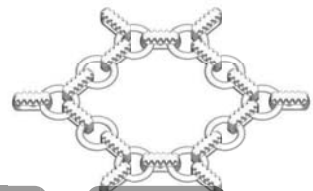
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