



## ABB's 5-point action plan to develop an electric mine

Electrifying a mine, like mining itself, is a process. Industry expertise and experience in all manner and scales of mining projects, of both underground and open pit mines, as well as those in remote locations, is key to overcoming the challenges of transitioning to an all-electric mine.

To help ventures succeed, ABB has set out a roadmap for mine operators on the journey to mine decarbonization and total plant electrification.

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## **1. Involve the right partners from the outset**

Pick a technology partner with:

- Real-world experience in electrifying, automating, and digitally connecting mine equipment and operations
- A broad portfolio of fit-for-purpose solutions across all stages in the mining cycle designed to meet the operational demands of the modern mine
- Long-standing strategic partnerships and a track record of co-creating solutions with OEMs and other mining companies to fast-track the development of new emissions-reducing systems for the electrification and automation of whole mining operations

Pre-planning will help increase added value, provide greater cost savings, and reduce complexity.

Involving a technology partner early means they can provide interoperable, fit-for-purpose solutions and technologies that make mines safer, and smarter, and reduce carbon emissions.

Digital integration of the whole mine means the process can be planned, monitored, and controlled, set up to plan and optimize operations and energy usage.



#### 2. Collaborate to optimize outcomes now and to create a foundation for the mine of the future

The mining industry is on the road to electrification. The transition from largely diesel and generator-powered equipment and operations requires a collaborative effort between partners and suppliers to ensure current and upcoming electrification technologies are compatible with existing OEM equipment for everything from mobile transport to ventilation.

Strategic collaboration between miners having the same interest will help push the collaborative technology development between technology providers and accelerate the adoption of carbonreduced and finally carbon-free solutions.

By creating open and collaborative platforms combining the industry stakeholders and technology suppliers, miners can have access to additional ideas and a pool of innovative solutions and influence the supplier ecosystem, shape policy, and share their experience and learnings with the wider community.

Identify and create a framework for ongoing joint development and co-creation with key partners to meet a wider range of needs:

- Mining Companies
- Mechanical
- Infrastructure and Civil
- Vehicle OEM or Retrofitter
- Mine Designer
- Different players depending on needs include technology providers, investors, service providers, consultants, EPC/EPCMs, and OEMS.



# 3. Design an all-electric mine with the future in mind

The entire mining ecosystem is on a journey to electrification. An electric mine looks different from a traditional mine and the design of an allelectric mine needs to make provision for future developments:

- New technologies such as charging, trolley, BESS, driving standardization
- Optimized and balanced grid design for new requirements
- Open communication standards for multivendor integration of fixed & mobile assets aggregated via one platform
- Real-time data acquisition, processing, and visualization
- Advanced analytics to improve operation & availability of assets

Work with partners to design an all-electric mine for now and the future, drawing on technology partner consulting services and domain knowledge to address:



- Optimized solutions and trade-offs (e.g., hoist vs. conveyors vs. trucks) considering geology and operations Integrated electrical solutions considering load peaks based on duty cycle, harmonics, voltage dip mitigation, and network protection
- Combined digital, automation, and electrification solutions, also considering existing systems and leveraging partners
- Identification of correct technology for applications, considering energy efficiency and environmental impact
- Focus on early solution standardization
- Assessment of energy needs to ensure mine sites scale the implementation of electrification technologies.

Variables to consider when exploring electrification options on a mine site include how renewables will be plugged in on a site; whether there are existing energy grids and battery storage facilities; and determining local network availability for digitalization. With mines opening in remote areas, located far from grid systems, the mining industry will rely more and more on renewable energy to drive its green development. The integration of renewable energy is an indispensable part of the ecosystem and needs to be embedded in mine design.

After all the variables have been considered, map a phased approach that can align with the electrifying of the entire mining ecosystem as it, too, evolves. Break down this long-term roadmap into short-term actionable projects, piece by piece, to transform operations.

A phased approach enables mines to immediately lower carbon footprints with limited up-front capital investment, while simultaneously advancing progressively as technology becomes more mature, scalable, and cost-effective.

For example, the **ABB eMine™ Trolley System** was installed and has cut carbon emissions by 90% on the trolley segment, paving a solid foundation to achieve the company's goal of net zero carbon emissions by 2035.

### 4. Invest in mining equipment and fitfor-purpose solutions that are tailored to the unique requirements of your allelectric mine

Fast-charging infrastructure and electric trolley systems will drive electrified mining forward. Ramping up the speed and efficiency of the power supply is important to keep vehicle downtime during charging to a minimum while optimizing battery design and maximizing productivity. Custom electrification solutions can be tailored to align with a mine site's efficiency targets – significantly reducing energy costs and the overall environmental impact of a site.

Integrating these solutions with automation and digital systems sets mine operators up to plan, monitor and control processes, optimizing operations and energy usage from the grid to the wheel.



**ABB's pilot solution eMine™ FastCharge** has kickstarted with 600KW, the highest power available on today's market, but we are working to deliver higher power to fit the demand of mining hauling trucks.

ABB, in collaboration with technology partners, piloted **eMine<sup>™</sup> FastCharge** as a stepping stone to pave the future of fast-charging solutions across the mining sector. Based on open charge communication protocols, fully automated and modularly designed, FastCharge is future-ready to accommodate higher charge powers for any truck.



#### 5. Manage the lifecycle of the mine and equipment for continuous performance improvement

Lifecycle management of equipment ensures maximum availability and equipment life and that a mine's technologies and production processes address critical environmental challenges – from installation to decommissioning. Employ remote monitoring to keep production up and running and advanced digital mining services to collect and analyze mining assets and operational data to identify, categorize and prioritize actions.

Remote services, predictive maintenance, upgrades, and retrofits help mining companies ensure maximum performance throughout the mine's lifecycle.



### **Electrifying** your mine also

**improves** the world beyond it.

Did you know? If every truck in every mine were electrified, every day we could remove 198,000 tons of CO2 from the air we breathe.

ABB eMine<sup>™</sup> is a comprehensive framework of electrification and automation systems that seamlessly integrate all mine operations from mine to port, making all-electric mining a practical reality.

As a leading force in this transformation journey, ABB is committed to partnering with customers to create the all-electric mines of the future. From designing and optimizing equipment to managing the entire lifecycle of the mine, ABB's technology and expertise can help customers every step of the way, transforming today's mine operations while improving the world beyond them.

#### Why wait? Contact ABB today to take the next step towards a sustainable and profitable future with all-electric mining.



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Contact us at: campaign.abb.com

#### Additional information

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