

# Breaking new ground:

## *Electrification, automation, and digitalization of mining drills*

**T**he relentless pursuit of greater efficiency, enhanced safety protocols, and a reduced environmental footprint is necessitating a profound transformation within the mining industry. At the forefront of this evolution lies the modernization of mining equipment, particularly drill rigs, through the integration of advanced technologies. Electrification, automation, and digitalization are no longer distant aspirations but tangible realities reshaping drilling operations, promising significant impacts on operational expenditures, overall productivity, ecological responsibility, and the well-being of the workforce.

One of the most significant shifts underway is the industry's move away from traditional diesel-powered machinery towards electric alternatives. This transition is propelled by several factors, including increasingly stringent environmental regulations aimed at curbing emissions, a growing ethical imperative for sustainable practices, and the compelling prospect of long-term cost advantages.

Electric drill rigs present a compelling value proposition compared to their diesel counterparts. Their most obvious advantage lies in the elimination of exhaust emissions at the point

of operation, contributing to a cleaner and healthier working environment for operators. Furthermore, the inherent simplicity of electric motors translates to reduced mechanical wear and tear, leading to less frequent maintenance schedules and a corresponding extension in the operational lifespan of the equipment. This increased uptime directly contributes to enhanced productivity. Economically, electric power often proves to be a more stable and ultimately less expensive energy source than diesel fuel, promising substantial cost savings over the long term.

Recognizing this paradigm shift, companies like Sandvik are actively deploying electric drill rig solutions tailored to meet these evolving demands. It is estimated that electric-powered drills currently constitute 15% to 20% of global sales for the surface drilling market, a figure projected to reach the 30% mark soon. Sandvik's commitment to this electric future is evident in the launch of its electrically powered iSeries rigs, including models like the DR416iE, and the subsequent expansion of this fleet to include the DR413iE, DR412iE, DR411iE, and DR410iE.

The rapid integration of automation technologies into mining operations is complementing the electrification trend. Automated drill rigs offer a powerful means of mitigating the inherent risks associated with manual drilling tasks, significantly enhancing worker safety by reducing or eliminating human intervention in potentially hazardous zones. Beyond safety, automation also unlocks substantial gains in efficiency and productivity. Through continuous, around-the-clock operation and the optimization of drilling parameters, autonomous systems can consistently outperform manual operations.

Sandvik has positioned itself as a frontrunner in the realm of automated drilling solutions. Their iSeries drill rigs are equipped with advanced features such as onboard automation features and remote operation capabilities. These functionalities not only bolster safety by removing personnel from the immediate drilling environment but also enhance efficiency by minimizing downtime associated with manual interventions and ensuring optimal drilling performance. With a strong focus on data analytics and automation, iSeries drills empower mining operations with a crucial competitive edge by driving more informed decision-making, streamlining operational workflows, and ultimately boosting productivity.

Central to Sandvik's automated drilling capabilities is the DRi operating system. Built upon Sandvik's Intelligent Control System Architecture (SICA), the DRi platform offers several key advantages: a unified platform that streamlines maintenance, updates, and troubleshooting across all iSeries drills; enhanced automation capabilities, providing a robust foundation for advanced functionalities like fully autonomous drilling; a strong



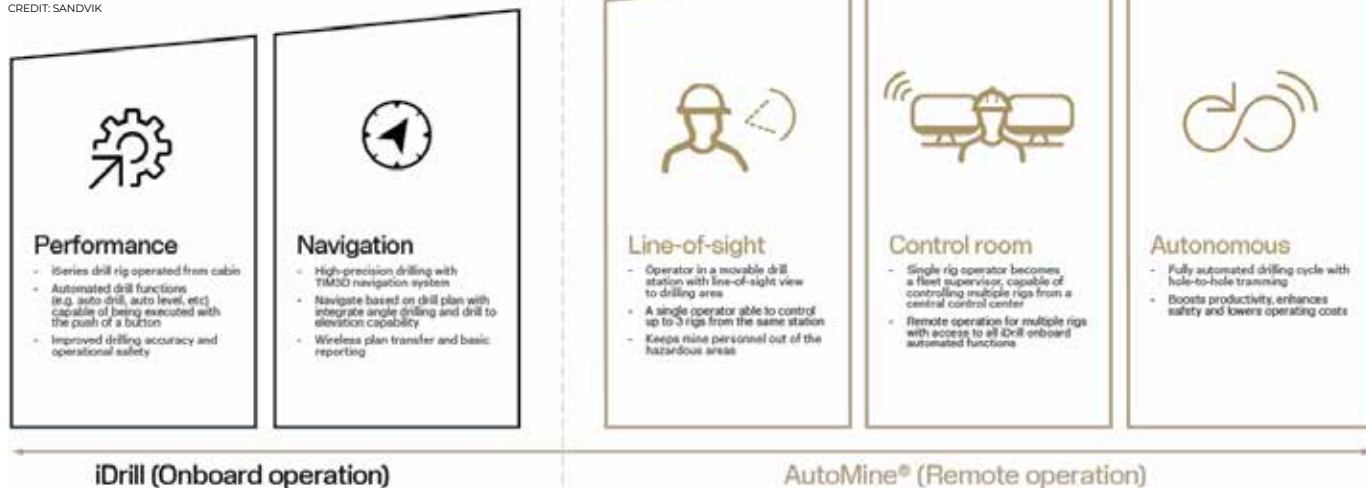
The  
iE series

**SANDVIK**

The Sandvik iE Series of electrically powered rotary drill rigs. CREDIT: SANDVIK

## Sandvik rotary drill rig scalable automation offering.

CREDIT: SANDVIK



focus on digitalization, facilitating comprehensive data collection, storage, and analysis for optimized operational insights; seamless integration with other mining systems, enabling a holistic view of the entire mining ecosystem; and an open architecture that supports integration with third-party software and hardware. This common development platform accelerates the rollout of product improvements across the entire iSeries rotary solution portfolio. DRi empowers operators with real-time data access, while also simplifying operator training through a consistent control system interface across all iSeries drill models.

### Sandvik rotary drill rig diesel modular platform.

CREDIT: SANDVIK



### Sandvik rotary drill rig electric modular platform.

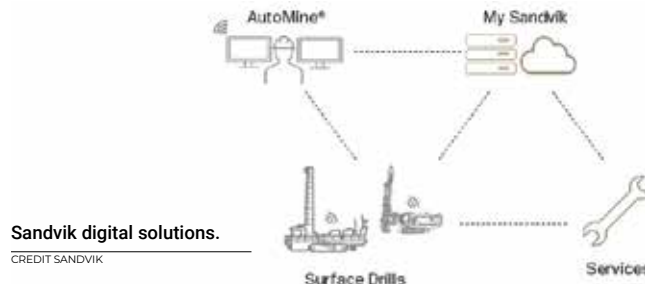
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Another characteristic of modern drill rig design is the adoption of modularity. Sandvik's modular approach offers significant benefits in terms of flexibility, maintainability, and long-term sustainability. Modular rigs can be readily customized and upgraded, allowing mining operations to adapt their equipment to evolving site conditions and operational requirements. Maintenance and repair are simplified as individual components can be quickly replaced or serviced, minimizing

overall downtime. Modular design also plays a crucial role in facilitating the transition towards electric-powered equipment. Sandvik emphasizes that their new modular designs are specifically engineered to ease the shift from traditional diesel to electric rotary blast hole drills, promoting a more sustainable future for the industry. This modularity allows for the easier integration of electric power units and provides a flexible framework for future electric drill rig development.

The intelligent utilization of data is crucial in optimizing drilling operations. Sandvik's solutions underscore this principle, characterized by My Sandvik Onsite. Built upon Sandvik's OptiMine technology, My Sandvik Onsite leverages time-stamped data to generate detailed reports on equipment utilization, operational status, productivity levels, and overall equipment health. The insights derived from this data can be used to refine drilling parameters, enhance operator training programs, and optimize mine planning strategies, leading to significant improvements in both productivity and profitability.



### Sandvik digital solutions.

CREDIT: SANDVIK

The convergence of electrification, automation, and digitalization is not merely a trend but a fundamental shift reshaping the future of drilling in the mining industry. These technological advancements are driving a holistic transformation, enabling mining companies to achieve greater operational efficiency, minimize their environmental impact, and foster more sustainable practices. As the mining industry continues to navigate evolving demands and increasing societal expectations, these technological innovations will undoubtedly play an increasingly critical role in ensuring a sustainable and efficient path forward. **CMJ**

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