

7th of May, 2026

9:00 - 15:00

online or in-person
in Turin, Italy

MINE.IO has received funding from European Union's Horizon Europe research and innovation programme under agreement No 101091885

We are excited to invite you to an workshop on **Sustainable Mining Practices in the Future From Demonstration to Market Perspectives**, hosted as part of the MINE.IO project. During this event, representatives of the MINE.IO project will present its key outcomes to project partners, relevant stakeholders, and the wider mining and raw materials community, and will demonstrate how the project's solutions support safer, more autonomous, and more sustainable mining operations.

Agenda

- 08:30 – 09:00 – Coffee & Registration
- 09:00 – 09:20 – Welcome & MINE.IO Project Introduction – Mine.io Overview
- 09:20 – 09:40 – **Mine.io Architecture & Digital Framework for the Digital Mine**
- 09:40 – 10:25 – **Pilot Demonstration I - Smart & Automated Operations**
- 10:25 – 10:45 – Coffee Break
- 10:45 – 11:20 – **Pilot Demonstration II - Autonomous & Electrified Operations**
- 11:20 – 12:00 – **Pilot Demonstration III - Environment & Waste Management**
- 12:00 – 12:50 – Lunch Break
- 12:50 – 13:10 – **Scaling Digital Mining - Social Sustainability of Digital Transformation in Mining**
- 13:10 – 13:30 – **Scaling Digital Mining - Standardisation Perspective**
- 13:30 – 13:50 – **Scaling Digital Mining - Market Analysis & Exploitation**
- 13:50 – 14:15 – **Collaboration with sister projects within the Smart EcoMine Hub**
- 14:15 – 14:25 – Conclusions & Outlook - Open Discussion
- 14:25 - 14:30 – End of Final Event Workshop

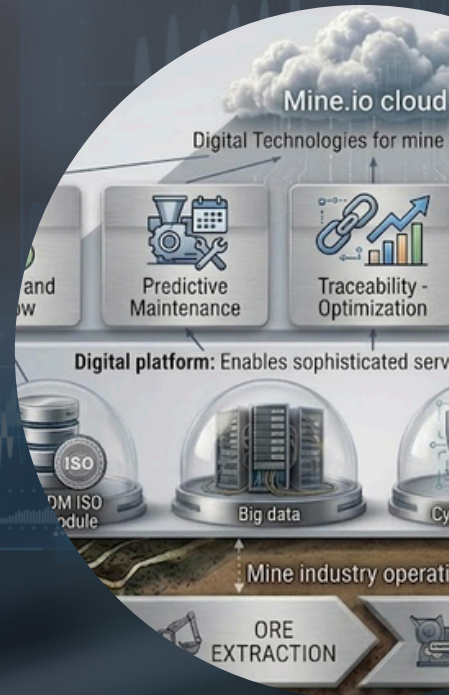
To register for the workshops, please visit our website: https://mineio-horizon.eu/2026_final_event_workshop/

Mine.io Architecture & Digital Framework for the Digital Mine

The Mine.io Architecture and Digital Framework for the Digital Mine provides a secure digital backbone enabling interoperability across mining operations and distributed sites, built around the Mine.io Big Data Platform for managing and exploiting heterogeneous data from equipment, sensors, and operational systems.

The architecture combines edge computing for real-time data acquisition and pre-processing with cloud-based Big Data services for scalable storage, analytics, and decision support, supported by distributed storage, scalable connectors, centralised asset cataloguing, and Open APIs. Interoperability is further reinforced through ISO 10303 integration via the PLM module, while well-defined data and metadata models ensure compliance with FAIR principles.

Designed with a security-by-design approach, the framework supports incremental integration of new systems and data streams, accelerating digital transformation, improving operational efficiency, and enabling sustainability monitoring across the mining value chain.

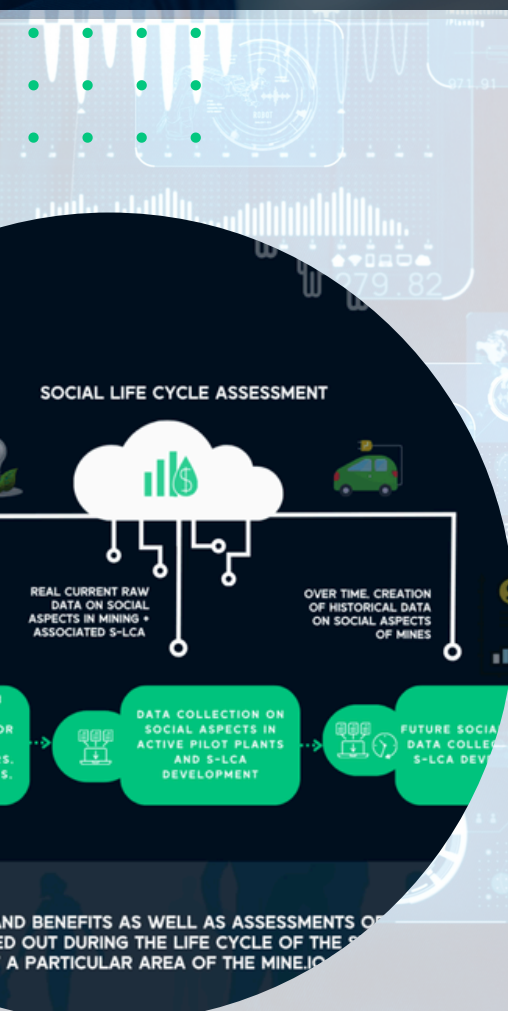


Social Sustainability of Digital Transformation in Mining

Explore how the digital transformation of mining—through automation, data-driven solutions, and emerging technologies—affects not only operational performance but also social sustainability.

A Social Life Cycle Assessment (S-LCA) framework developed within the Horizon Europe project Mine.IO is presented to assess social risks and benefits for workers, local communities, and society. The approach combines scenario-based analysis, targeted data collection, and a scoring system to evaluate the social implications of digital mining technologies, demonstrated through a pilot application.

By embedding social sustainability into innovation processes, this work supports the development of mining systems that are not only more efficient and safer, but also socially acceptable and aligned with long-term sustainability goals.



Scaling Digital Mining – Standardisation perspective

The Road to Interoperability: Methodology and Standards in Mine.io.

This session introduces the approach behind Mine.io's interoperability framework, showing how standards and scalable methodologies support data integration and automation in digital mining.

It outlines how selected international standards and emerging specifications are applied to enable interoperable data exchange, automated workflows, and smart maintenance across heterogeneous mining systems.

The session also highlights Mine.io's active role in shaping future standards through collaborative initiatives, illustrating how standard-driven design supports efficient integration, future-proof innovation, and cross-project interoperability within the Smart EcoMine Hub ecosystem.



Pilot Demonstrations I - Smart & Automated Operations

Discover how AI, machine learning, and digital twins are transforming the mining value chain from exploration and core analysis to flotation and smelting, turning conventional processes into intelligent, data-driven systems. During exploration, AI-powered Measurement While Drilling and predictive maintenance improve drill rig efficiency, enabling faster and more reliable resource identification.

Advanced analysis of drill cores using X-ray scattering and X-ray computed tomography ensures accurate laboratory calibration and enhanced material characterisation. In the concentration stage, the PIT-System, an AI-driven flotation monitoring solution, continuously analyses copper content in flotation froth using real-time imaging and process parameters.

The session addresses key challenges, computational methods, and the industrial potential of automated flotation control. It also highlights how innovative sensor technologies and digital furnace control systems optimise smelting and refining, with real-time monitoring and process models improving efficiency, quality control, and overall metallurgical performance.



Pilot Demonstrators II – Autonomous & Electrified Operations

As mining environments become increasingly complex, deeper, and in many cases inaccessible, innovative technological approaches are required to ensure operational continuity while reducing environmental impact and improving worker safety.

In this context, the session presents how wireless power transfer solutions, autonomous and remotely operated vehicles, underwater robotics, and muon-based sensing technologies can be combined within a unified digital ecosystem.

These technologies are supported by real-time data acquisition and analytics, enabling continuous monitoring, precise navigation, and adaptive decision-making in both active and legacy mining environments, including flooded or hazardous sites that are difficult or unsafe for human access.

By combining these innovations, mining operations can enhance safety, optimize performance, and move towards more sustainable and resilient practices.



Pilot Demonstrators III – Environment & Waste Management

This session addresses key challenges in environmental risk management and monitoring in mining, highlighting how advanced digital solutions support safety, sustainability, and long-term operational resilience. It explores integrated approaches that enhance risk assessment, enable preventive actions, and support responsible management of mining waste.

The session introduces selected advanced technologies, including geophysical prospecting, geotechnologies, drone-based monitoring, digital environmental monitoring tools, material traceability solutions, and high-resolution 3D mapping.

Together, these technologies improve the understanding of site conditions, enable dynamic monitoring of environmental change, support risk prediction and prevention, and contribute to circular-economy-oriented and sustainable environmental management.



Scaling Digital Mining – Market Analysis & Exploitation

This session explores the exploitation strategy of the MINE.IO project, with particular attention to the market positioning of Mine.io and the pathways enabling the transition of key project results from research activities towards market-oriented applications. The discussion addresses mechanisms supporting knowledge valorisation and long-term innovation within the mining and raw materials sector.

By focusing on how project outcomes are translated into practical use, the session outlines potential routes for further development and real-world uptake of key innovations. It highlights approaches that reinforce stakeholder confidence, support knowledge exchange, and contribute to the sustained impact and adoption of the project's results beyond the research phase.



Collaboration with sister projects within the Smart EcoMine Hub

This session highlights collaboration within the Smart EcoMine Hub, focusing on the DINAMINE project as an example of joint efforts to advance innovation across the European mining value chain. The discussion places particular emphasis on cross-project synergies with Mine.io, illustrating how coordinated approaches within the cluster support the development of digitally connected, standardised, and environmentally responsible mining practices.

By drawing on the experience of DINAMINE, the session explores integrated and data-driven approaches to modern mine management, addressing themes such as real-time performance monitoring, automation, and system integration. It outlines how collaboration within the Smart EcoMine Hub can facilitate knowledge exchange, accelerate the uptake of innovative solutions, and contribute to the long-term digital and sustainability transition of the mining sector in Europe.

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7, 2026



By attending this workshop you will learn:

- **How to Build a Digital Backbone for Mining**
 - Discover how the Mine.io platform operates as a secure digital backbone, enabling seamless interoperability across mining operations through Big Data, edge computing, and ISO 10303 integration.
- **The Power of AI and Digital Twins**
 - Explore how AI-powered Measurement While Drilling (MWD), predictive maintenance, and digital twins for smelting and ventilation revolutionize the mining value chain, boosting efficiency and energy savings.
- **Future-Proofing through Autonomy and Electrification**
 - See how underwater robotics, autonomous vehicles, and wireless charging solutions reduce CO₂ footprints and eliminate human risk in hazardous or inaccessible flooded mines.
- **Sustainable Waste Management & Circular Economy**
 - Gain insights into how UAVs (drones), electromagnetic sensing, and blockchain traceability enable responsible waste management, 3D mapping of environmental assets, and the re-utilisation of mining waste.
- **Socially Responsible Digital Transformation**
 - Understand the Social Life Cycle Assessment (S-LCA) framework tailored to the mining context, designed to manage social risks, improve working conditions, and strengthen community acceptance.
- **Strategic Standards and Market Readiness**
 - Learn how Mine.io actively shapes global industrial standards (from Muography to Wireless Power Transfer) and provides clear pathways for transitioning research outcomes into scalable, market-ready solutions.

Contact us



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What you will take away:

- **A complete overview of Mine.io's achievements**, validated across multiple European pilot sites.
- **A deep understanding of the technologies, methods and standards** that will shape the next decade of digital mining.
- **Insights into real industrial impacts**, including efficiency gains, safety improvements, environmental monitoring, and circularity potential.
- **Practical pathways for adoption**, including market insights, exploitation strategies and opportunities for future collaboration.
- **Direct access to experts**, pilot leaders and standardization contributors involved in building the Mine.io ecosystem.
- **A forward-looking perspective** on how digitalisation, automation, sustainability and interoperability will transform mining beyond Mine.io.

Join us to network with industry leaders and explore the breakthrough innovations shaping the future of a sustainable Digital Mine 4.0.

Project Consortium

