



## **IMMERSE: Immersive Virtual Tours on Critical Minerals for Clean Energy Transitions**

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### **Abstract**

The transition to a sustainable energy future has led to a growing demand for Critical Raw Materials (CRMs), accompanied by a corresponding expansion of their supply chains. To address the emerging challenges in this sector, particularly within the mining industry, it is essential to adopt sustainable engineering solutions that comply with legal requirements related to mining extraction, geotechnical practices, and health and safety standards.

One key approach is to enhance the education and training of geoscientists, including engineers and geologists, by integrating Virtual Reality (VR) technology into Undergraduate and Postgraduate study programs. The use of immersive virtual tools in core subjects equips future professionals with advanced skills and practical expertise.

VR applications have notably transformed mining site operations by facilitating tele-remote control of machinery, enabling 3D modeling of site environments, and simulating real-world conditions in a safe and controlled manner. As a co-partner of the IMMERSE project, the School of Mineral Resources Engineering at the Technical University of Crete aims to modernize educational curricula and prepare future engineers for the practical implementation of VR technologies in the mining sector.

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