

Impact highlights

Transforming bauxite waste (red mud) into usable soil

- Partnering with industry to develop a technosol—a soil-like substance made from process waste.
- The 10-year research project has gone from the lab to a small field trial and is now undergoing large and long-term field trials.
- The technosol rehabilitates soil for future land use, improves economic and ecological sustainability and is a cost-effective remediation of contaminated land.

JKHF mini: a commercial laboratory fluidised bed flotation cell

- Fluidised bed flotation has the potential to significantly reduce the immense energy requirements associated with comminution.
- The JKHF mini provides a method to measure the technology’s performance at a small scale (only 1–2kg of sample per test), which is critical for predicting full-scale performance.
- The JKHF mini enables rapid and efficient testing for essential operations such as ore amenability and metallurgical evaluation, circuit modelling and design, and routine metallurgical assessment.

Queensland Mineral deposit atlases

- A resource for explorers to improve their capability to recognise the signatures and haloes of major deposits in Queensland’s Northwest Mineral Province and Northeast Mineral Province.
- The Northwest atlas details 28 mineral deposits spanning a range of commodities including copper, zinc, lead, silver, gold, uranium, rhenium, molybdenum, cobalt, and phosphate.
- The Northeast atlas details 28 deposits spanning a range of commodities including tungsten, zinc, tin, cobalt, scandium, indium, silver and lead.

OreSand

- A circular economy solution that reduces mineral waste and improves global sand sustainability.
- OreSand is a sustainable, manufactured sand created from mineral ore during processing. By integrating mineral processing circuits, we co-produce clean, low-carbon, fit-for-purpose sand before it becomes tailings.
- OreSand prevents tailings at the source and provides an alternative to sand extracted from rivers, coasts, and other fragile ecosystems.



Learn more

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Sustainable Minerals Institute

CAPABILITY STATEMENT



About SMI

The Sustainable Minerals Institute (SMI) at The University of Queensland (UQ) is a global leader in research and innovation to advance sustainability in the minerals and resources sector. We support the transformation of mining to meet rising mineral demand while addressing environmental, social and governance challenges.

For 25 years, SMI has delivered research excellence grounded in expertise, integrity, and a commitment to being a trusted and constructive partner. As an independent, not-for-profit institute, we work with industry, government, Indigenous communities and civil society organisations to design evidence-based solutions for complex, real-world mining challenges.

SMI is the world’s largest co-located, interdisciplinary organisation in mining and sustainability research.

We comprise more than 300+ experts across seven specialist research centres and strategic programs, bringing together technical, environmental and social disciplines to address challenges across the mining lifecycle—from exploration and development through to operations, closure and legacy management.

Through the research centres and SMI Chile, we connect research, policy and practice between Australia and Latin America—regions facing shared environmental, operational and social challenges associated with resource development.

JKTech, SMI’s technology transfer company with more than 40 years’ experience, plays a critical role in translating much of SMI’s research into operational tools and services, extending our impact through laboratory services, specialised software and equipment, consultancy and training.

SMI supports the development of current and future mining leaders through UQ’s higher degree by research programs and a growing portfolio of professional development programs and masterclasses—building the skills, leadership capability and systems thinking required to navigate an increasingly complex operating environment.



Top 5

UQ is consistently ranked in top 5 in the world for mining and mineral research.



300+

SMI has over 300 researchers working to solve mining and mineral related challenges.



600+

SMI has partnered with over 600 industry, government and civil society organisations.



5+

SMI delivers research and training in South America, Europe, Africa, Asia and Australia.

Impact

SMI supports organisations at every level—from artisanal miners to major mining companies, from community organisations to international bodies. Our track record of delivering meaningful outcomes is grounded in strong, collaborative partnerships with industry, governments, academic and civil society.

SMI’s research focuses on four key impact areas:

- 1 Delivering better sustainability outcomes for people, environments, and regions.
- 2 Enabling lower-footprint mining projects with improved models for shared value.
- 3 Developing capable, responsible leaders and organisations across the sector.
- 4 Strengthening sector-wide capability to meet future mineral supply challenges.

Practical solutions

SMI is distinguished by its ability to translate world-leading research into practical, operational outcomes for industry and society. This includes globally recognised tools and programs that support safer, more efficient and more responsible mining, such as:

- **GMIRM**—A globally available suite of training programs delivering practical and effective risk management solutions to equip people working in the mining industry with the knowledge and skills to better identify and mitigate hazards.
- **JK MillFIT, JK CycloPS, and JK VMillFIT**—Model-based soft sensors developed as advanced tools for monitoring and controlling comminution circuits.

SMI is distinguished by its ability to translate world-leading research into practical, operational outcomes for industry and society.

Capabilities

SMI delivers integrated capability across the mining lifecycle, combining geological, mining and mineral processing, health and safety, environmental, social and governance expertise, including:



Water, environment, and mine waste management

Rehabilitation and circular economy solutions.



Mineral characterisation and exploration

Rock and deposit analysis, mapping and evaluation.



Mining and processing technologies

Separation technologies, high-temperature processing and flotation.



Risk, safety and human factors

Workplace safety, worker health and operational risk management.



Energy transition

Decarbonisation and low-emissions mining.



Environmental and social responsibility

Cultural heritage, community and Indigenous engagement, governance and policy.



Mining governance and policy

Sector governance, policy analysis and independent review.



Training and capacity building

Leadership development and knowledge exchange.

