FOUNDATION PROJECT 4.3

Network of demonstration and testing sites

Australia has thousands of developing, operating, suspended and abandoned mine sites. Many would be suitable for showcasing technologies and new approaches to assist transitions towards new economies. This foundation project engaged mining companies, government, and other stakeholders to establish a descriptive resource base of national mine sites where past closure activities have been well demonstrated (lessons learnt) or where technologies and management options might be evaluated and demonstrated at a relevant mine scale.

KEY FINDINGS

- Over 100 mine sites were investigated for demonstration or trial site potential. These sites spanned resource types, climatic variability, geology, and hydrology regimes, with specific considerations including whether mines were closed or operating, rehabilitated or not, and whether key issues and challenges associated with mine site closure and transitions existed (such as post-closure site ownership, Traditional Ownership links, waste rock landforms, open pits, tailings facilities, revegetation efforts, and potential acid forming materials).
- A broad range of sites were identified. From a more detailed assessment of 20 sites, several offer the potential for demonstration sites. Of these 20, 12 are operational, 5 are closed, and 3 are abandoned. They span all Australian states and the Northern Territory, covering urban to regional areas, arid to tropical climates, hard rock to sand and sedimentary geologies, and quarry resources to iron ore, encompassing a range of minerals and coal. Focused conversations can now determine lessons already learnt at each location, sites suitable for testing and showcasing new approaches and technologies for closure, and sites suitable for applying current approaches and technologies at mine-site scale.
- Key challenges and potential future focus areas and projects were identified. Potential research areas include waste rock dumps, final voids, tailings and pond facilities, potential acid forming materials, final landforms, revegetation, landform reshaping, water management, community preferences, and transitions to post-mining economic benefits.

THE CHALLENGE

Transitioning mine sites from closure to new community and economic-focused assets requires a concerted effort between numerous stakeholders. A key challenge is to firstly develop and establish new approaches and technologies that offer step-change advances, and that consider the different conditions across Australia. Focused discussions are then needed to implement new or existing technologies and approaches at approving candidate sites, and to manage any arising issues around further upscaling and demonstration. This is required for broader implementation.

THE OPPORTUNITY

Through extensive research with industry and government partners regarding transitioning mine sites, this project catalogued priority demonstration and testing sites/areas, and identified technologies and project displays for broader national action. The opportunity exists to demonstrate feasibility at scale and create uptake and adoption pathways for other mining sites.

National distribution of selected mine sites. Abandoned mine sites are highlighted in blue and either operating or closed mines are highlighted in yellow.

OUTCOMES

A catalogue of demonstration site options has been developed, which itemises the various challenges and issues faced at each location. Subsequently, several recommendations arose that will help provide a national resource for potential future action, and promote closure good practice within the industry:

1. Research proponents and other stakeholders should lead in pairing research aims and objectives from CRC TiME Foundation Projects and subsequent projects, as well as broader work outside the CRC, with having potential demonstration sites to test and showcase methodologies at scale. Such an asset can help with advancing Australia's future research agenda.
2. Demonstration sites should be promoted as a platform to enable better communication of site-specific challenges and engagement between industry/government and researcher/mining equipment, technology and services companies in addressing specific challenges.
3. A process/pathway should be established to showcase the success/failure of technology approaches at specific sites, such as rehabilitation trials.
4. A platform should be established to capture high-priority information from the different sites, such as strategies for acid mine drainage, waste rock dump stability, final voids, tailings, revegetation, and planning.
5. Demonstrations that incorporate First Nations and regional community aspirations and concerns and direct outcomes of positive value should be considered.
6. A strategy and mechanism should be developed to link the complementary efforts being undertaken by mining companies, state and federal agencies, and other entities.

NEXT STEPS

The next step is to progress discussions between industry and research and development proponents so appropriate technologies, closure approaches, and research can be showcased at scale. Further steps as outlined above can then be undertaken accordingly.

PROJECT PARTNERS

CSIRO; Peter Waters, formerly South 32; Alcoa of Australia Limited; Department of Energy and Mining, South Australian Government; Rio Tinto Services Limited; Department of Environment and Natural Resources, Northern Territory Government; CMTE Development Limited trading as Mining3; Hanson Construction Materials Pty Ltd; Iluka Resources Limited; Energy Australia Yallourn Pty Ltd

PROJECT PUBLICATIONS

REVIEW FULL REPORT

Bekele, E.B. and Davis, G.B. (2021), A national network of demonstration and testing sites – scaling 'mine closure' technology and approaches to mine-site scale. CRC TiME report, Western Australia

Interactive web-based database of a national network of demonstration and testing sites – CRC TiME Foundation Project 4.3

Slide presentations for Dig Deeper Annual Forum – Workshop 4: Innovation through Demonstration and Trial Sites (30 November 2021)

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ABOUT US

The Cooperative Research Centre for Transformations in Mining Economies is part of Australia's national innovation ecosystem. Our diverse partnership brings scale, collaboration and coordinated investment to tackle the most complex mine closure and post-mine transition challenges. Together we're rethinking what's possible to improve outcomes for people, communities, the environment and industry.

We acknowledge the traditional custodians across all the lands on which we live and work, and we pay our respects to Elders both past and present.

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