



Creating Impact Through Collaboration

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Meet your Speaker



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Subject matter expertise

- Climate risk and climate scenario development
- TCFD and climate-related reporting
- Decarbonisation strategy planning, roadmap and business case development



The decarbonisation challenge





Mining companies face a large challenge of decarbonising their industry at pace.

They cannot do it alone



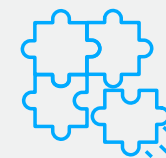
Large GHG emissions

In 2019, mining represented 6.2 per cent of Australia's energy demand and 9.5 per cent of greenhouse gas (GHG) emissions

Financial Constraints



Tight financial constraints in an already competitive environment demanding high levels of investments



High Complexity

Fragmented organizations often spanning multiple geographies and involving complex ownership and operating structures



The collaboration solution



Collaboration to achieve net zero mines

Opportunities and challenges for zero carbon mines stem from the ability for collaboration

Why collaboration?

Collaborating with other entities along the mining value chain can **accelerate the journey to zero-emission mining**.

Pooling knowledge and resources to tackle the challenges creates opportunity for greater learning and access to the benefits of economies of scale.

There are opportunities for collaboration to **help capture the enablers and reduce barriers** to decarbonisation.



Enablers



Finance

- Financial case to decarbonise is **positive** in many cases without consideration of emission reduction benefits.
- Access to **lower costs of capital**, and the potential to **charge higher premiums** for low-carbon products.

Barriers



Implementation

- Implementation is a challenge due to low number of **mines willing to be first over and pilot new technology**.



Technology/Commercial Readiness

- Technological readiness is generally high but overall **commercial readiness is still generally low**.



Finance opportunity



Finance

Financial institutions and government are deploying billions of dollars towards 'green finance'

The main **opportunities** to explore are:



Green loans and debt (CEFC and other financial institutions)



Green bonds



Government grants



Renewable Energy PPAs



Product pricing premiums

As well as the emerging carbon markets which manage residual emissions.



Kathu CST plant

ENGIE commercial operates the 100MW CST Kathu Solar Park.

The park was financed through a debt facility of R12 B ~706M Euro, at the time the largest deal done in South Africa.

Kathu Solar Park **signed a 20-year Power Purchase Agreement (PPA)** pursuant to the REIPPP procurement programme with the off-taker/buyer, including equity ownership by nearby Iron Ore miner.

More than 45% local suppliers and staffing, huge training effort due to remote location.

Source: [Kathu 100 MW CSP](#)

Finance case study

Kathu Solar Park is a concentrated solar power thermal energy power plant, located near Kathu in the Northern Cape province of South Africa.



Source: [Tractebel](#), [Engie](#)



Implementation opportunity





Implementation

Implementation risks can be overcome with partner / OEM trials to reduce the risk on large scale deployment and speed up time to final implementation.

Opportunities that can be **unlocked** with collaboration are:



OEMs can **communicate their functional technology needs through development and implementation phases** to mitigate risk once operational.



Increase the understanding between **OEMs and miners** around the pipeline of emerging technologies, investment priorities and delivery timelines.



The implementation phase can be managed between the OEMs and miners to help ensure that the new technology does not **affect or slow production**.



Mine planning with the various stakeholders will ensure mine design is compatible with low-emissions technologies, avoiding sunk costs and maximising life-of-mine returns.



Health and Safety risks can be managed and mitigated through collaboration



Rhyno, the world's first hydrogen mining truck solution

The Rhyno project is a “**demonstration of feasibility**” implemented in South Africa to develop and the world's largest hydrogen-powered mining truck, capable of carrying a payload of 290 tonnes.

The truck is hybrid battery – H₂, so it charges on decline, using H₂ fuel and battery for the incline.

This project is being carried out jointly with AngloAmerican, one of the world's largest players in the mining sector.

Engie is responsible for producing renewable hydrogen while AngloAmerican retrofit an existing ICE for the vehicle.

Implementation case study

ENGIE and Anglo American inaugurate the world's largest hydrogen mining truck. Once trial is successful, it will be scaled up across the world.

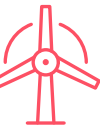


Source: Anglo American



Technology and commercial readiness opportunity





Technology / commercial readiness

The mining industry needs to work with researchers to communicate technology barriers, and with suppliers to firm up market signal and provide the confidence needed for new entrants.

Opportunities that can be **unlocked** with collaboration are:



Increase the technology readiness of essential, yet immature technology, such as long-duration storage.



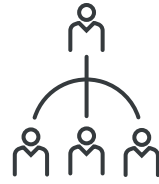
Capturing data across fragmented supply chains to provide **transparency, traceability and substantiate** sustainability claims.



Working with stakeholders to pool resources towards a significant research or commercial opportunity (i.e. Hydrogen hub and pipeline / MVR) **targeting economies of scale** for the whole industry.



Avoid being locked **out of a specific technology** by adopting before peak demand inundates supply chains.



Leaders



Everledger



Battery Industry CRC



South32