

MANDELA MINING PRECINCT
MINDS FOR MINES

Guideline:
Equipment and Communication Utilisation

science & innovation
Department
Science and Innovation
REPUBLIC OF SOUTH AFRICA

CSIR

MINERALS COUNCIL
SOUTH AFRICA

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About the Mandela Mining Precinct



The Mandela Mining Precinct is a Public-Private Partnership between the Department of Science and Innovation and the Minerals Council South Africa. The Precinct is jointly hosted by the Council for Scientific and Industrial Research and the Minerals Council. The Mandela Mining Precinct is an initiative aimed at revilatising mining research, development and Innovation in South Africa to ensure the sustainability of the industry. This is achieved through the South African Mining Extraction, Research, Development and Innovation (SAMERDI) strategy.

The strategy comprises six research programmes:

1. Longevity of Current Mining;
2. Mechanised Mining Systems;
3. Advanced Orebody Knowledge;
4. Real-Time Information Management Systems;
5. Successful Application of Technologies Centred Around People; and
6. Test Mine.

This summary was developed under the **MECHANISED MINING SYSTEMS (MMS)** research programme. The programme is aimed at providing sustainable mechanised drill, blast and mechanical rock breaking solutions in advancement to facilitate achieving zero harm, whilst maintaining and defending desired production rates at minimised costs, within the Au, and PGM mining industries.

MECHANISED DRILL AND BLAST PROGRAMME: **2018/2019**
MDB18WP4.6

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Executive Summary

This research focuses on the Energy Utilization project introduced by the Mandela Mining Precinct in 2019, part of the SAMERDI Mechanised Drill and Blast programme. The project aims to develop comprehensive energy-efficient guidelines to support future mechanized mining systems and operations, collaborating with industry representatives to establish criteria for R&D and conceptual designs.

Key activities include a literature review, a two-day industrial workshop, and the creation of an energy efficiency guideline, culminating in an integrated final report. These guidelines target improvements in energy efficiency across gold and platinum mining sectors, emphasizing alternative energy sources, optimized energy supply strategies, and efficient energy utilization. The POET framework will guide the energy efficiency activities. The project deliverables are organised into five chapters:

1. Introduction to the project and the POET framework.
2. Literature Review on energy sources, supply infrastructure, and utilization, followed by a one-day workshop to gather expectations from mine stakeholders.
3. Development of Energy Efficiency Specifications focusing on renewable energy integration and technical standards for solar PV plants.
4. Expert Insights on holistic optimization approaches for demand-side energy management and renewable integrations.
5. Financing Approaches for alternative energy investments, highlighting successful models and available green finance options.

The project seeks to address the mining sector's energy challenges, particularly considering recent load shedding and the need for embedded generation solutions, aiming to facilitate a transition to more sustainable energy practices.

Methodology

The summary of each milestone deliverable with findings, conclusions and recommendations. A project holistic summary of the project.

Research Findings

Literature Review establishing alternative energy resources and energy efficiency guideline and industrial workshops presenting energy efficiency guideline processes.

Conclusion

Supported by the proposed POET framework, the review successfully covers the areas of alternative energy resources, power supply infrastructures, and energy utilisation, for the purpose of developing a cost-effective plant wide energy solution. Supported by the proposed POET framework, the energy efficiency guideline successfully covers the areas of EE specifications, energy optimisation, local policy and green fund opportunities for the purpose of developing a cost- effective plant wide energy solutions. The two industrial workshops are well organised, presented and attended. Numerous positive feedback is received as good indication that the information shared during the workshops is useful and informative.

Way Forward

The project team would like to have more engagement with the mines to obtain better understandings of their energy related challenges on the mines. The planned presentation to the Technical Steering Committee in March 2021 is a great opportunity for the engagement. Over the long run, we plan to push forward the proposed research into action.