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The use of renewable energy in small scale mining

Ledwaba, Pontsho Francinah

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ABSTRACT

Electricity has been identified as an important input in economic growth and social development. The emergence of electricity sector has in most cases been as a result of increased economic activities; particularly mining and manufacturing. These two industries are known to be large users of electricity; accounting for over 50 per cent. With increased electricity demand, South Africa is facing electricity shortages – this was evident during black-outs in 2008. Coupled with this challenge, is rural electrification and climate change concerns. With grid electrification deemed uneconomical, rural areas are in need of an alternative, cost-effective power supply. This study investigates the potential use of renewable energy (RE) resources in small-scale mining (SSM). By nature, SSM activities are poverty-driven and hence occur mostly in rural areas. Because of their location, their development is hampered by the lack of basic infrastructure in rural areas.

South Africa is well endowed with renewable energy resources. The country's renewable energy base is sufficient enough to power both large-scale and small-scale energy projects. Renewable energy development in the country is still at its infancy stages – with large-scale projects being prioritised. The barriers in the renewable energy sector include: legal and regulatory barriers; lack of R&D; lack of funding mechanisms; technical capacity and knowledge; and cost of renewable energy technologies. High costs associated with renewable energy technologies have been at the forefront. However, improvements in technology and innovation, has decreased the costs considerably making renewable energy technologies comparable with traditional energy resources.

This study has shown that small-scale mining activities can be powered through small-scale renewable energy projects. These are projects with capacities ranging from 1MW to 5 MW. However, the capital costs remain a concern. Access to funding is still a major concern in the sector with the majority still experiencing difficulties obtaining funding. More so, the nature of small-scale mining activities does not allow the uptake of medium to large-term investment decisions. This suggests that the long-term benefits of renewable energy technologies will not be fully realised, if these decisions remain captive to the SSM sector.

It is recommended that, firstly, small-scale mining operations be integrated into rural renewable electrification programmes to ensure sustainability and harmonization. Although it was proven that SSM operations can be powered through RE projects, affordability remains a critical concern. However, since government is rolling out RE projects in rural areas, SSMs can be integrated in those projects. This will ensure that the long-term benefits of renewable energy projects are realised. Secondly, since renewable energy can be used to power a variety of equipment directly, an investigation into potential renewable energy resources to power SSM machines directly should be conducted.