

Introducing solar power in mining industry is complex

Cronimet Mining Power Solutions GmbH (CRMPS) has built a first photovoltaic (PV) diesel hybrid power plant in the MW-scale at its Thabazimbi chromium mine.



In these power plants diesel consumption is reduced through the integration of a photovoltaic power plant. In comparison to traditional grid-connected PV power plants the engineering requirements are much higher.

A study conducted by CRMPS and THEnergy, 'Solar, energy efficiency and load-shifting for an optimised energy management in the mining industry', shows the importance of considering both, demand side and supply side, at the same time. The study is based on 26 interviews with experts from the mining and energy industries. The experts are from Africa, Australia and Europe.

Cost savings

Typical cost savings from the PV side are in the range of 25-30%. In very remote locations with elevated diesel prices the reductions can amount to more than 70%. The study shows that on the demand side energy efficiency measures and load-shifting can have substantial effects on the electricity consumption of a mine.

Energy efficiency measures can be applied all along the mining value chain as well as for auxiliary applications. The main fields are compressed air systems, ventilation, material handling, pumping, crushing and milling. Energy efficiency can account for electricity reductions of 5-20% and load-shifting for energy cost savings of 5-10%. Energy efficiency measures and load-shifting schemes have a direct influence on the optimal design of the PV plant.

Avoided or shifted energy consumption allows for designing the PV plant in an optimal way. Often the integrated solution decreases the amount of capital expenditure needed for upgrading existing diesel gensets with solar power considerably. "Mining process and solar experience allow for creating tailor-made solutions. In the end the customers profit by spending less," explains Rollie Armstrong, managing director of CRMPS.

Knowledge is required

Energy efficiency measures and load-shifting require a thorough knowledge of mining processes. It is obvious that the simultaneous optimisation of demand and supply side are much more complex than the construction of a traditional PV power plant. A prerequisite for finding the best solution is combining skills from both worlds, from mining and solar energy. In addition, many of the solutions are novel.

Many improvements have been developed during the operation of PV diesel hybrid power plants at mining sites. A track record of on-site testing helps to implement new solutions in the most efficient way. "The study is an excellent example to show how complexity is increasing if solar energy moves toward major industrial consumers," says Dr. Thomas Hillig, founder of THEnergy.

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