

RPMGlobal helps leading miner chart path toward decarbonisation

Global mining company | Electrification study | Consulting & Advisory services



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Overview

RPMGlobal was approached by a large international mining company to assist with decarbonising their mine haulage operations. Given on-site haulage is the largest single consumer of diesel fuel leading to significant greenhouse gas emissions, the company deemed it imperative to investigate opportunities to reduce diesel usage. In line with the company's commitment to reducing its carbon footprint and operating sustainably, electrifying this operation— with power supplied by renewable sources—offers the opportunity to improve the mines' environmental performance through the reduction in greenhouse gas emissions and introduction of renewable energy.

The mining company had identified a number of existing technologies, which in combination, offer a sustained haulage solution:

- Electric power transfer from overhead trolley line infrastructure (trolley assist);
- Electric drive haul trucks.
- Mobile equipment batteries.
- Megawatt (MW) scale batteries.

The company engaged RPMGlobal to not only determine if the technology was able to effectively and reliably provide a haulage solution, but also the extent to which infrastructure would be required to implement it.

Challenge

This specific combination of technologies has never been applied to mining. The application of the individual technology to other industries suited different environments that created limiting perceptions of how the technology could be used. As the chosen vendor to undertake the high-level analysis, RPMGlobal had to address the following issues:

- Sufficient battery life to complete a full haul cycle without recharging if the system was down.
- The physical limitations of where a trolley system could be installed.
- A wide range of mine layouts.
- A number of different truck types.

Approach / Solutions

RPMGlobal adopted a dynamic and strategic approach to the project scope that allowed solutions to be developed and changed in response to study results and client feedback.

- RPMGlobal's Advisory team have a high level of experience in the installation of trolley systems internationally that allowed for the key system parameters to be determined. RPMGlobal then applied its Open Pit Metals scheduling solution and leading mining simulation tool, HAULSIM, to model a large number of haul routes in a wide range of mine layouts. This allowed the volume of diesel that could be saved and the depth of battery discharge to be determined.
- Installation of the trolley system for this solution was targeted to enable the battery to be recharged during the haul cycle removing the need for the truck to be taken out of service for recharging, or for a battery swap. Locations for the trolley system were determined by both the amount of recharge needed, and the areas that were common between different haul cycles.
- RPMGlobal leveraged its established relationship with suppliers of electrical infrastructure and mobile equipment to access key technical information, engage in collaborative solution development, and test the practicality of the study outcomes.

Impact

RPMGlobal's Advisory team successfully applied its decades of industry experience to overcome the challenging and unique nature of the scoping study, thereby delivering the following results:

- RPMGlobal's detailed analysis of the system demonstrated that it was able to provide a reliable and robust electric haulage system in a range of open cut mine profiles.
- Having considered a range of pit designs that cover a number of different commodities, RPMGlobal determined that 100% of diesel for haulage was eliminated by a combination of the electrification techniques we identified. For the base case scenario of a deep mine, the client could save 80 million litres of diesel fuel per annum.
- The high reliability of the system was determined by the fact that every haul cycle considered could be completed on battery power alone, and in most cases multiple cycles could be completed. The extent of trolley infrastructure required to recharge the battery ranged from 4-17 kilometres.
- RPMGlobal identified further opportunities to improve the systems through optimising the size of the haul truck battery, and concentrate the location of the trolley system for recharging. Once implemented, these improvements will result in a haulage system that is not only robust and practical, but has a significantly lower cost and higher productivity than what had been initially proposed by the client.

RPMGlobal was able to harness leading technology while drawing on the Advisory teams' strong expertise and knowledge in the field to produce a positive outcome for the client. RPMGlobal's robust analysis has proved the efficacy of the electric haulage system based upon a suite of proven technologies, providing the client with confidence as it moves forward with the next stage of the study to determine the economic viability of electrifying its operation.

