

# Analyzing energy consumption and gas emissions of loading equipment in underground mining

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## ABSTRACT

In an environment of rising energy prices and mining at greater depths, cost-efficient loading and hauling equipment is essential. Conducted at an underground mining operation, this study analyzes the energy consumption and gas emissions of diesel and electric load-haul-dump machines (LHDs) with similar bucket capacities. Based on energy prices from the first quarter of 2014, results of discrete event simulation show that energy costs for diesel and electric LHDs are US\$0.24/t and US\$0.07/t, respectively. Also, diesel LHDs emit 2.68 kg CO<sub>2</sub> per litre of diesel fuel, whereas using electric machines reduces the need for ventilation to mitigate engine heat and emissions and reduces energy costs.

**KEYWORDS** Discrete event simulation, Energy consumption, Gas emissions, Loading systems