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Innovator sees green light for massive retrofit industry

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**EPCA to debut 100t electric mining truck**

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**The Electric Mine Consortium and EPCA to run Cat 777 electric truck trial**

Posted by Daniel Gleeson on 23rd June 2023

# EPCA to debut 100t electric mining truck

Engineering workshop EPCA is converting a 100t mining truck into a battery electric vehicle with the industry getting a glimpse of the zero-emissions Caterpillar 777D at an electric mining conference in Perth this year.

The truck will be able to run continuously for eight hours under full load and recharge in less than one hour. It will be unveiled at The Electric Mine 2024 conference on May 21.

EPCA will retrofit 44 mining trucks at its Hazlemere facility once the demonstration model is finished. The company is constructing a new workshop in Muchea which will triple production capacity to 80 trucks a year.

The company says fully electric haulage would benefit balance sheets as much as ESG credentials and claims one EV truck can save about \$745,000 in opex, maintenance and capex yearly.

EPCA evaluates haul fleet conversion projects on a case-by-case basis and carries out detailed performance testing using environmental and mining data.

"Before we even build the machine, we take our client's environmental and mining data and run it through an extensive simulation we've developed in-house," EPCA founder and owner Clayton Franklin said.

"That simulation shows us exactly how the battery electric truck performs in the mine environment. We can demonstrate to 90% accuracy how well our truck works in each mine."

The relative mechanical simplicity of EVs reduces maintenance costs and Franklin said reduced operating costs also increased the potential of EV conversions to save money.

"It's a bit like a Tesla, there are far fewer moving parts on a battery electric truck," Franklin said. "You have a lot less mechanical wear and therefore the maintenance costs come down dramatically, we estimate a 28% reduction. There are no air filters, oil filters, coarse fuel filters, oil changes or oil sampling and therefore a massive reduction in minor and major maintenance activities.

"The operating cost for a 100t mining truck running on diesel is \$112/hour.

"If you compare that to the cost of power in the Pilbara, which is about \$22/hour, you get an 80% saving.

"Admittedly, there is an increase in capital of about 25% because you have

to install the batteries but if you look over 20 years and you consider the total cost of ownership, you'll see a diesel truck is about \$25 million, whereas a battery-electric truck is about \$11 million, which includes replacement of the batteries every five and a half years."

EPCA's electric motors, power electronics and inverters have a 20-year life expectancy and Franklin said the ideal maximum age of a truck to be converted to a EV was between 20,000-40,000 operating hours.

The company also assists with building charging infrastructure which can be designed to use renewable power.

"The [charging] infrastructure consists of a DC charger which comes in the form of a 10-foot sea container," Franklin said.

"For one of our 100t trucks, there would be about four of these sea containers.

"Our DC charger can be coupled to an AC network or DC network which allows the miner to plug into a DC solar farm.

"For 10n of our trucks running, you would need a 250m by 250m solar farm – about 8MW. You would also need a BES (bulk electric system) so that it can store energy past the irradiance periods."

EPCA's EV conversion process takes 12 months and involves disassembly of the truck's existing diesel engine and running gear. The lead time on parts is six months and despite the company sourcing components from Europe and the US, Franklin pointed to a dearth of binding agreements with suppliers, allowing it to secure the highest quality products on the market.

"We source globally, our cooling circuit equipment comes from Germany, our batteries come from Europe and our motors are from America," Franklin said. "We look for a proven track record [for our parts] as well as a high number of installations using those parts which are already in operation.

"All our products are commercially available, we're not trying to build battery packs or do any R&D, our systems are well-tested and well-tried."

Franklin has spent more than 25 years in the mining industry and started his career as an electrical project engineer at WMC's Kwinana nickel refinery. He then worked on renewable energy systems for indigenous communities before spending time at BHP Ltd's Jumblebar and South Flank projects as a safety engineer and



**EPCA founder Clayton Franklin inside the gutted 100t Caterpillar 777D the company plans to convert into a fully electric mining truck**

Chevron's Barrow Island Gorgon LNG plant as an E&I engineer.

His first taste of electrical engineering came when growing up on a banana farm in Cloncurry, Queensland. Together with his father, a mechanical engineer, he converted a quad bike to electric power which still runs and charges on the farm's photovoltaic system.

EPCA aims to export diesel-to-electric conversion kits for mining equipment globally and Franklin said the company planned to work on its project pipeline this year.

He cited conversations with mine operators in Australia, Africa and Canada about EV conversions, a sign the mining industry is serious about decarbonisation and said the sentiment towards building a net zero economy would only strengthen.

"Mining companies need to take responsibility for the environmental aspects of their operations," Franklin said.

"I don't think the technical challenges to reduce carbon emissions from mining would be particularly difficult to overcome. Each year the public sentiment to build a net zero economy is increasing and with this, there is a desire for mining companies to act."

– Michael Cameron