# Reference report: Fully electric dumper

The world's largest electric vehicle is driven by power electronics from ARADEX. The 110 ton dumper is purely battery driven and operates a complete day without charging. Indeed, it even generates more energy than it consumes.

## The most important facts:

+ 40 km/h maximum speed, 20 km/h on 10% inclines
+ No top-up charging required
+ Energy supply via recuperation of braking energy
+ It is possible to feed energy into the local electricity grid
+ 6200 Nm continuous and 14.500 Nm peak torque
+ ARADEX power electronics for efficient energy management
+ Winner of the eMove360°- award in the category "Electric vehicles"

## The project

A simply superlative project. The eMining AG, a company based in Switzerland, electrified a 45 ton (unladen weight) dumper using highly effective power electronics from ARADEX. This is to date the largest and most powerful vehicle in the worldwide which is not powered by any form of combustion engine.

## The challenge

The huge weight of the dumper was a particular challenge. The dumper should be able to manage 20 ascents and 20 descents per day without having to be charged from the power grid.
In daily operation the empty dumper has an ascent of 12%: For the descent the dumper is fully loaded and has a weight of 110 to.

For use in every day operation, however, two further parameters had to be taken into consideration.

1. Often the load is too heavy and so the maximum weight is exceed. In order to counteract this, the drive was designed for a total weight of 135 to.
2. During descents shunting might be required which means travelling uphill for a short while under full load.

In order to guarantee the required flexibility the drive train was designed for a speed range up to 1650 rpm.

## The solution

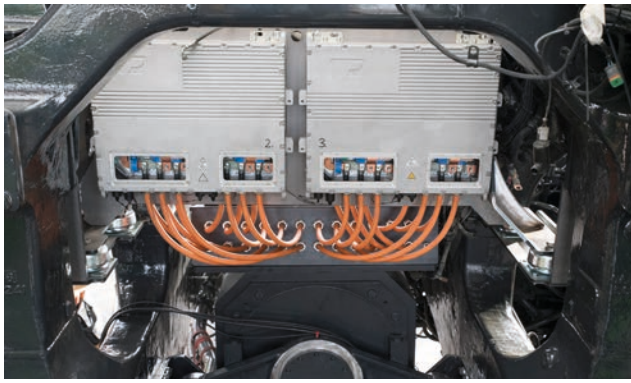
The dumper was equipped with a 700 kWh battery and is driven by a central synchronous motor with max. 1120 kW and 6200 Nm torque. Four VP600-18W268 VECTOPOWER inverters were used for the energy management. This inverter is especially suitable for traction applications requiring high power and enables an efficient motor control and high efficiency. In addition, a VP600-18W140 VECTOPOWER inverter was used for an auxiliary drive.

## The result

The drive system together with the power electronics is designed so that the dumper recuperates more energy when braking on the descent than is required for the ascent. The recuperated braking energy thus not only supplies the vehicle energy requirements but also enables C02 free electricity to be fed back into the grid during breaks.

In October 2017 the vehicle won the “eMove360°” award in the category “electric vehicle”. The vehicle will be tested under the toughest conditions until the end of 2017 before it starts operation at the cement factory of the Swiss Ciments Vigier SA.

# Energy plus vehicle: generates more energy than it consumes.



All photos: © eMining AG Andreas Sutter

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A|N 20171106_POS_00250_EN Nov 2017