



# Articulated vehicles with hybrid technology for Parma

# Parma

## Project characteristics

- **unique combination of hybrid and trolleybus technology**
- **Vossloh Kiepe developed the environmentally-friendly technology as far back as 2008 for installation in Van Hool trolleybuses**
- **measured energy savings of around 20 percent compared with conventional trolleybus designs**

Northern Italian public transport operator T.E.P. (Trasporti pubblici Parma) ordered nine hybrid trolleybuses from partners Van Hool and Vossloh Kiepe in 2011.

The newly designed articulated vehicles from Belgian vehicle manufacturer Van Hool will be equipped with electrical traction equipment and a regenerated energy storage system by Vossloh Kiepe. This combination of hybrid and trolleybus technology is totally unique. Recent comparative tests, which measured the vehicles' energy consumption, confirm long-term savings of up to 20 percent.



Kiepe ESM energy storage unit

This is made possible by high-performance capacitors integrated into the Kiepe on-board energy storage unit. These supercaps store the kinetic energy regenerated during braking. This energy is then released again to be used for acceleration, the heating and air conditioning systems as well as for overhead line-free operation.

For longer routes without overhead line contact, a diesel unit conforming to Euro V emissions standard is also fitted. A force ventilated traction motor powers the second axle gear.



Vehicle control module

Technical data	
Design / model	Trolleybus ExquiCity by Van Hool, Belgium
Maximum speed	Limited to 60 km/h
Supply voltage	DC 750 V
<b>Roof-mounted equipment group</b>	DGG 440 for DC 750 V
Concept	Active, air-cooled
Input voltage	DC 750 V
Cooling	Active, air-cooled
<b>Traction inverter</b>	DPU 455, 250 kW
<b>Static convertor</b>	BNU 545, 35 kVA/400 V, DC 24 V/350 A
<b>Current collector</b>	OSA 501
<b>Traction motor</b>	220 kW
<b>Diesel generator</b>	100 kW, Euro V