



Vossloh Kiepe
City-Industry-Summit in Parma, 21.10.2010



Vossloh Kiepe

Kiepe in the Vossloh Group

Rail Infrastructure



- Switch Systems (Cogifer)
- Rail Fastening Systems

Transportation



- Locomotives
- Transportation Systems
- Electrical Systems / Components (Kiepe)

Vossloh Kiepe

Our Products – A Selection



Diagnostic
Systems



Power
Electronics



Hybrid Bus



Trolley Bus



LRV

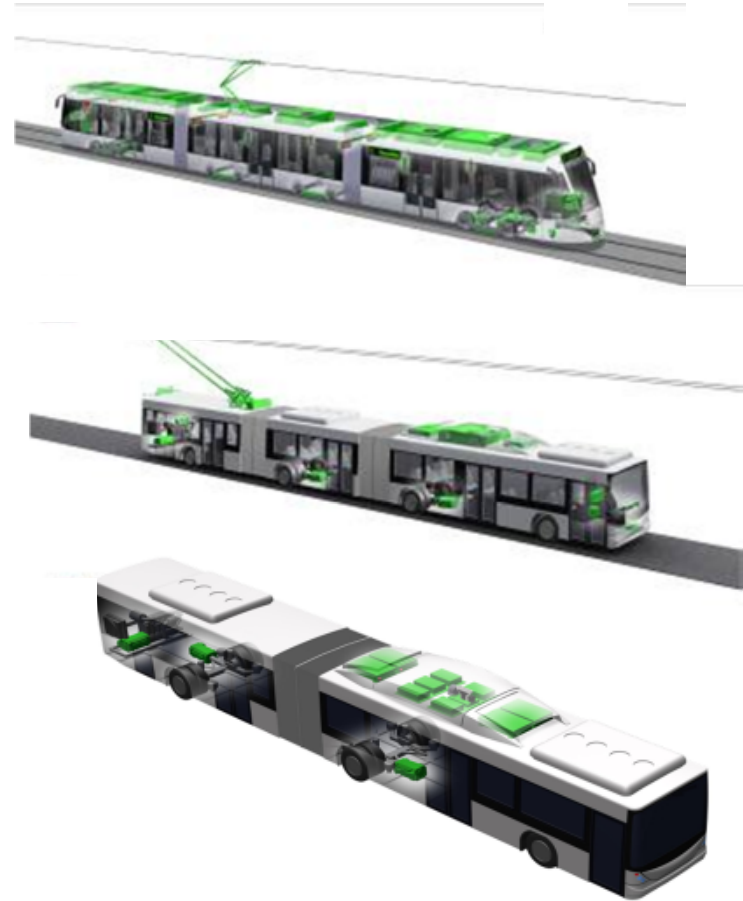
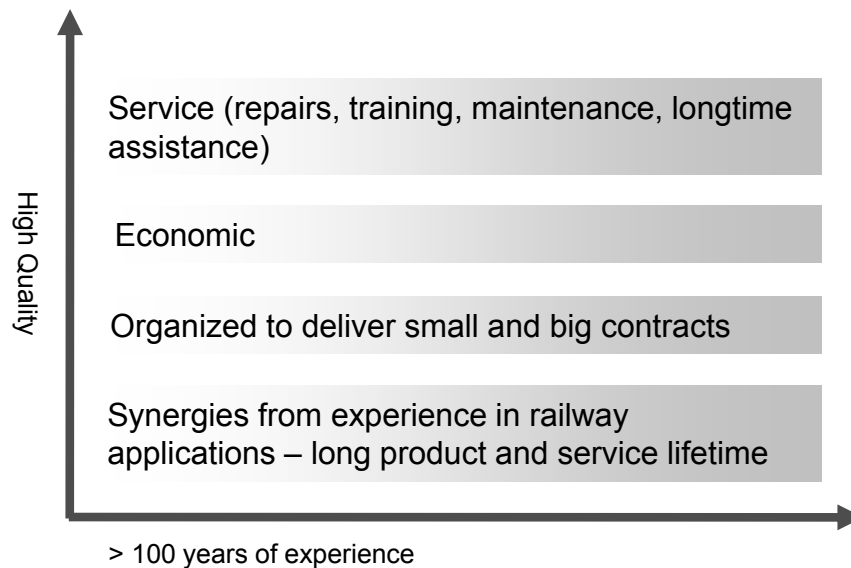


EMU

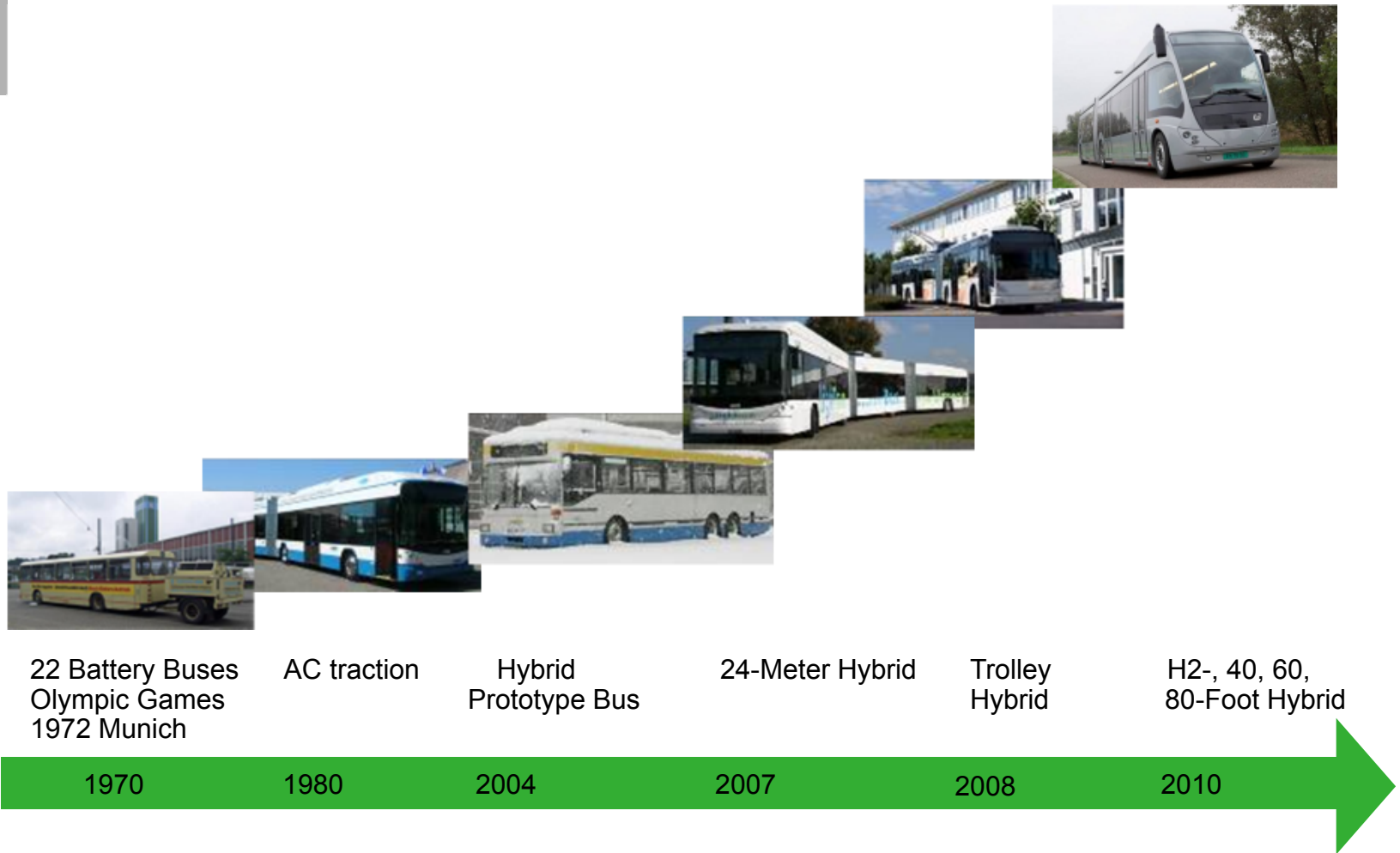
for

Vossloh Kiepe

More Than 100 Years of Experience



Vossloh Kiepe Innovation



Vossloh Kiepe

One Platform – Many Possibilities

Battery

Trolley Bus Vancouver



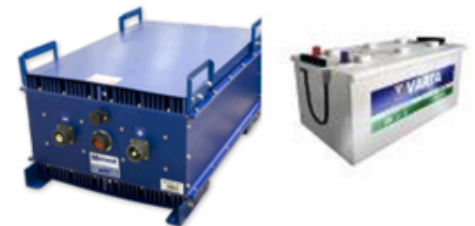
Ultra Caps

Hybrid Bus Luxembourg
Hybrid Trolley Mailand



Hybrid Storage

H2-Bus



vossloh
KIEPE

Vossloh Kiepe

key references



Electrical Systems for Buses

References – a selection

- ▶ **Germany:** Esslingen, Solingen, Eberswalde
- ▶ **Ecuador:** Quito
- ▶ **Greece:** Athens
- ▶ **Italy:** Bologna, Modena, Parma, Genua, Lecce, Milan
- ▶ **Canada:** Vancouver
- ▶ **Latvia:** Riga
- ▶ **Austria:** Linz, Salzburg, Innsbruck
- ▶ **Switzerland:** Fribourg, Geneva, Biel, Lucerne, Zurich, Bern, St. Gallen, Montreux
- ▶ **Venezuela:** Mérida
- ▶ **Belarus:** Minsk
- ▶ **Norway:** Bergen
- ▶ **USA:** Philadelphia
- ▶ **Hungary:** Budapest



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key references - Italy

Electrical Systems for Buses References – a selection

Italy:

- ▶ Avellino
- ▶ Bologna
- ▶ Genova
- ▶ Lecce
- ▶ Milano
- ▶ Modena
- ▶ Parma
- ▶ Rimini
- ▶ Bari
- ▶ Pescara



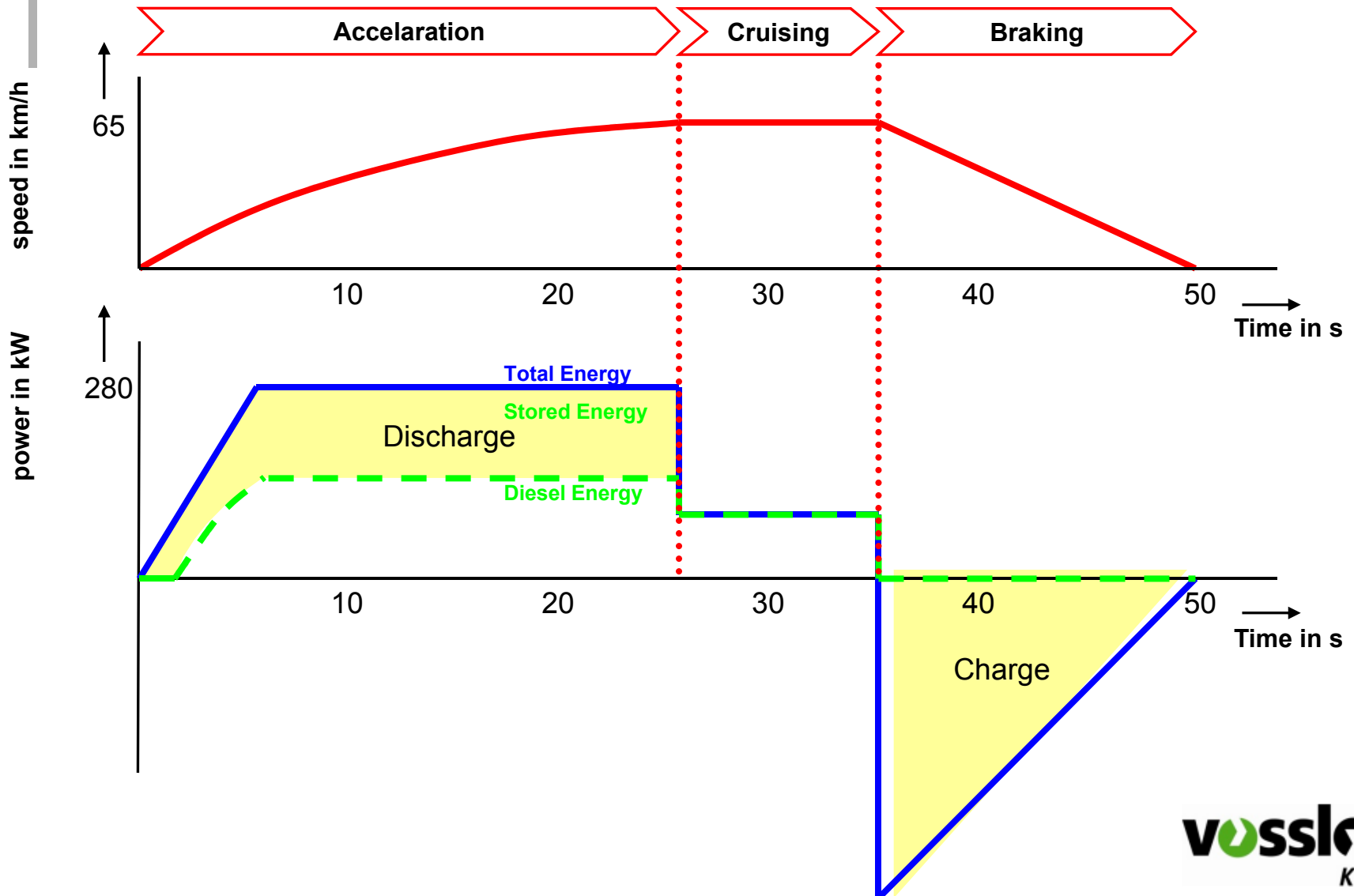


Efficient in Public Transport – Serial Hybrid Traction Systems



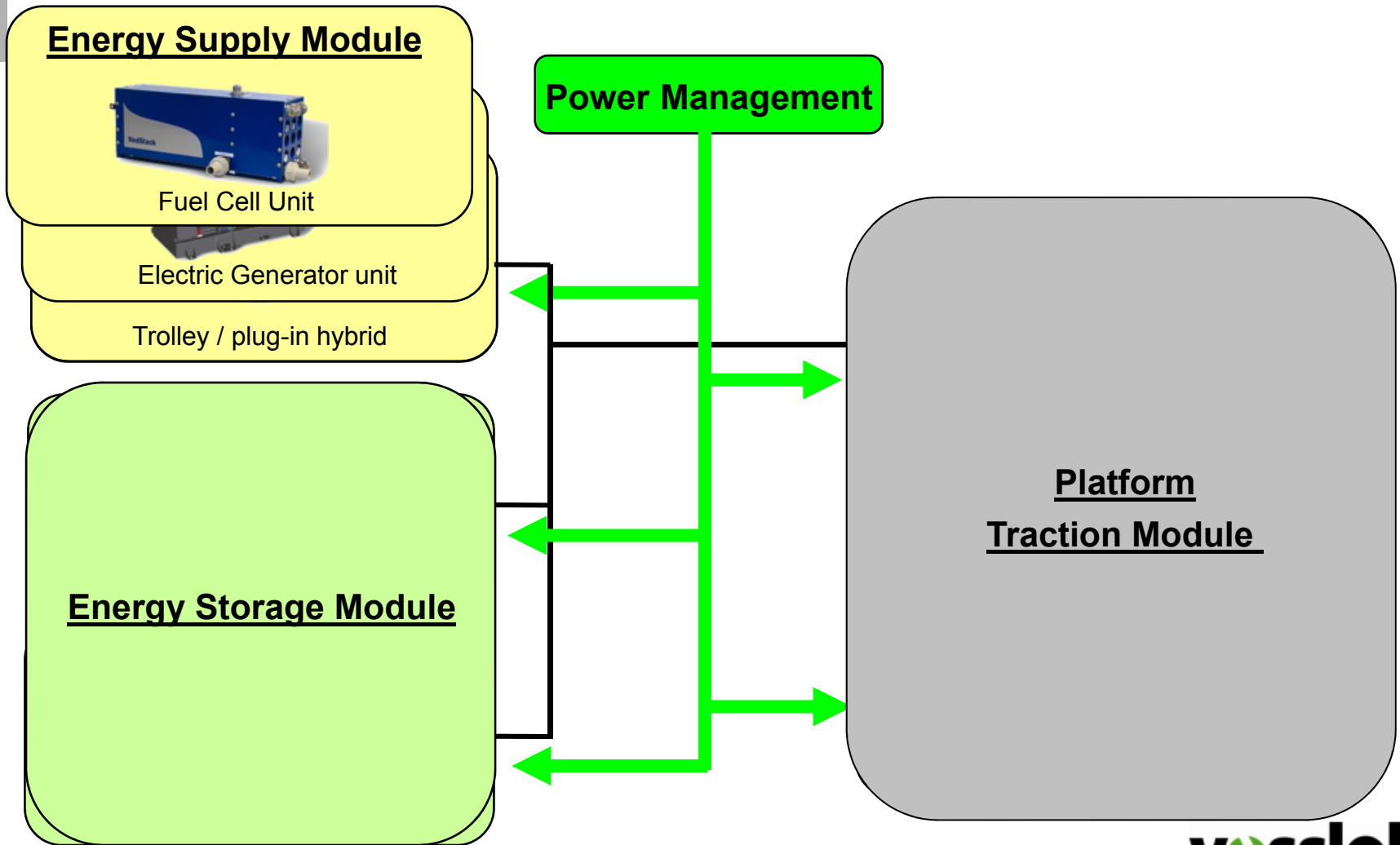
Efficient in Public Transport – Serial Hybrid Traction Systems

Operation Cycle



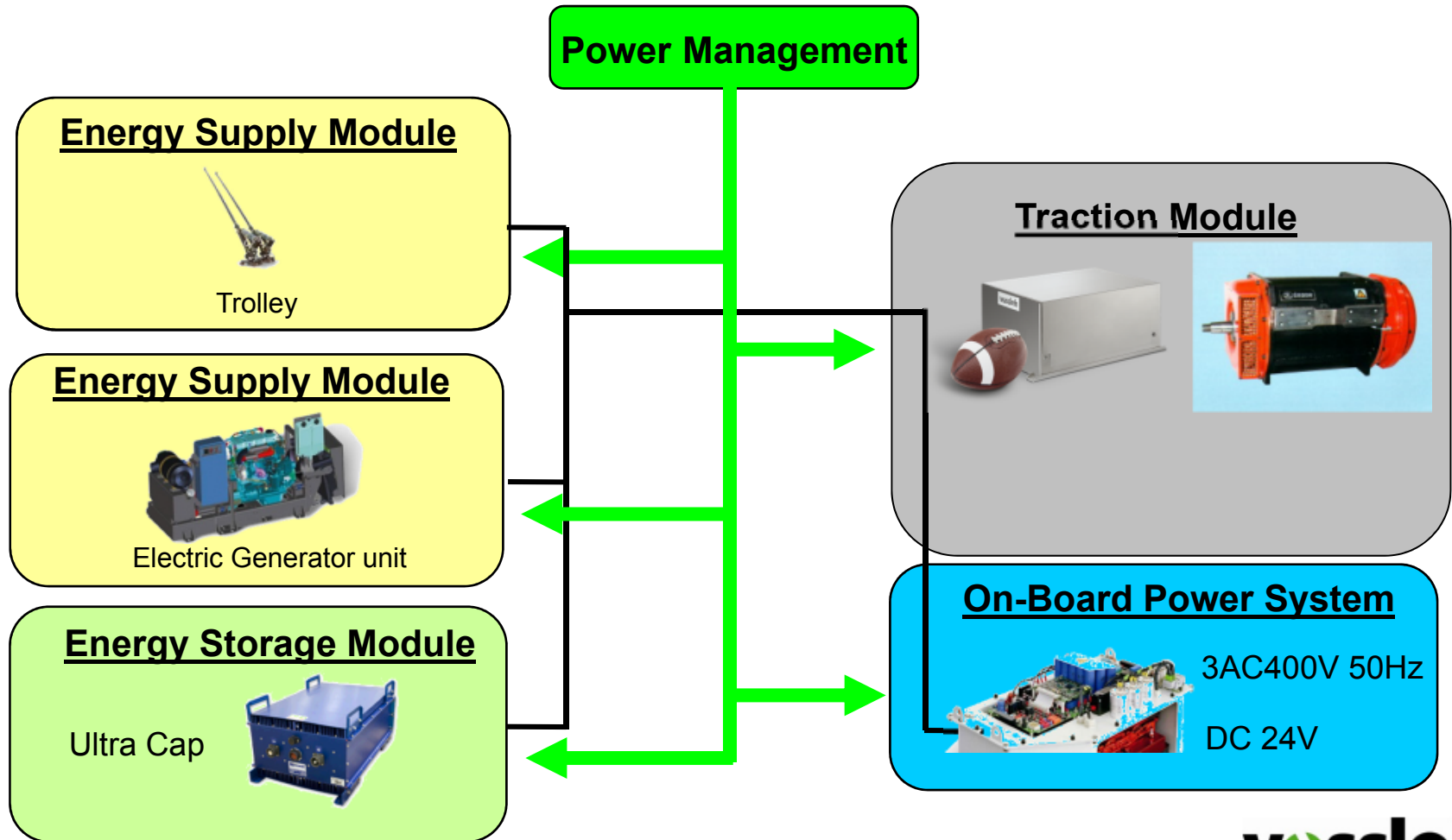
Efficient in Public Transport – Serial Hybrid Traction Systems

One Platform – Many Possibilities



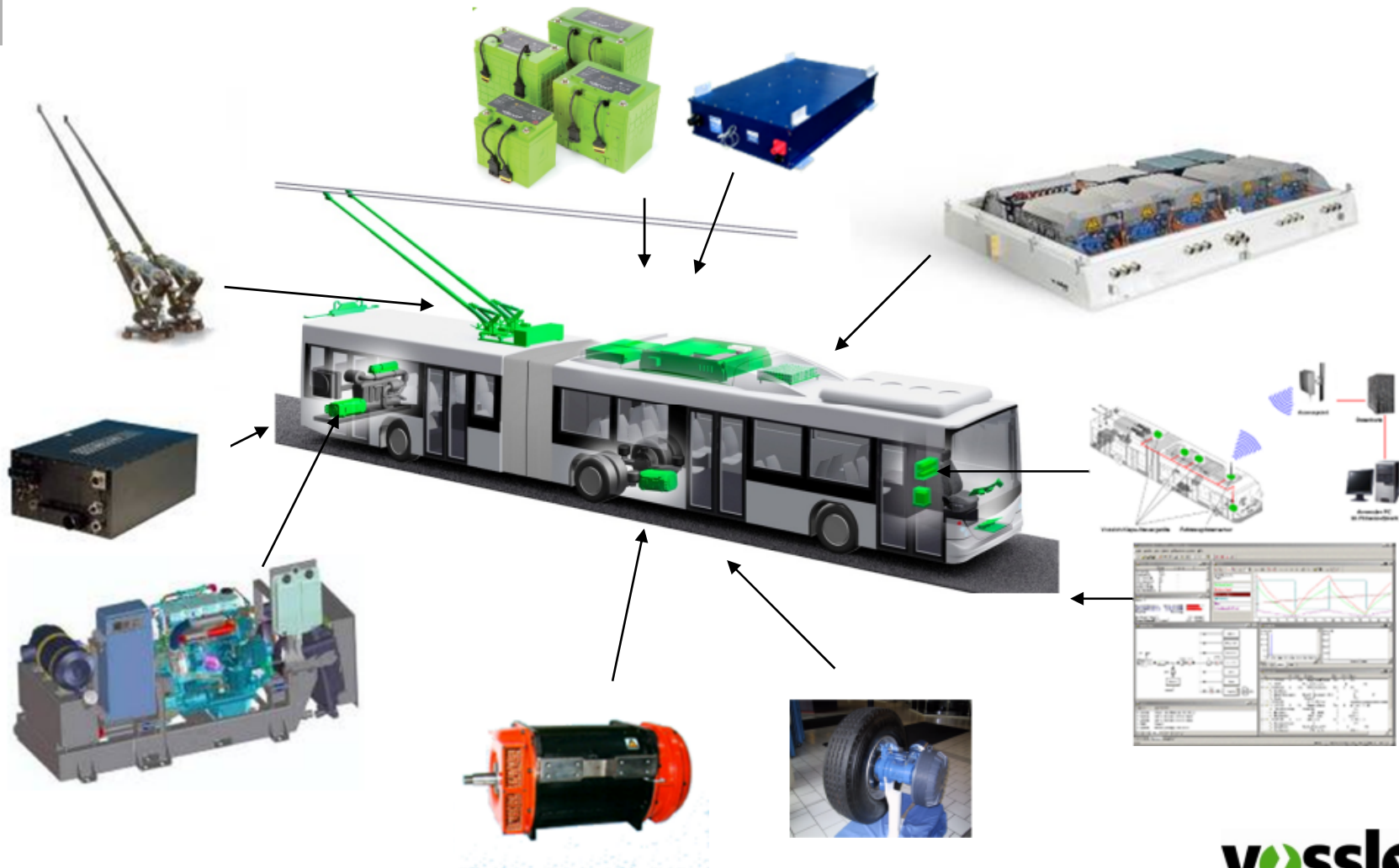
Efficient in Public Transport – Serial Hybrid Traction Systems

One Platform – Many Possibilities



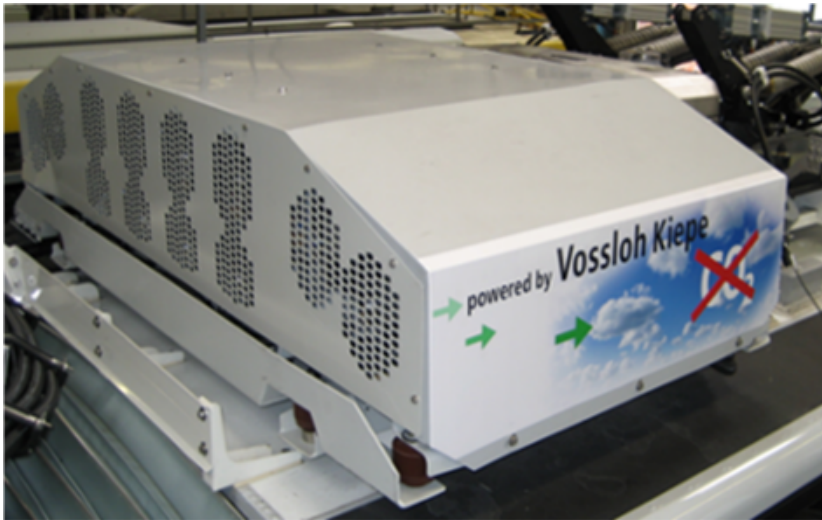
Efficient in Public Transport – Serial Hybrid Traction Systems

One Platform – Many Possibilities



Efficient in Public Transport – Serial Hybrid Traction Systems

Energy Storage System ESS-Cap



Designed by Vossloh Kiepe

Weight: ~400kg per unit

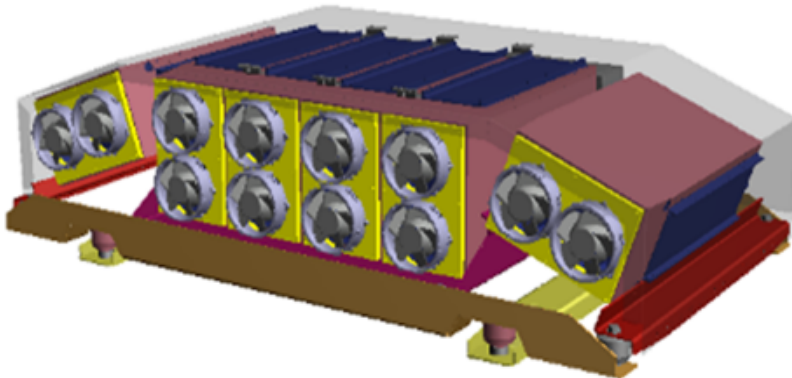
Energy: 0.5kWh (usable)

Lifetime: approx. 10 years

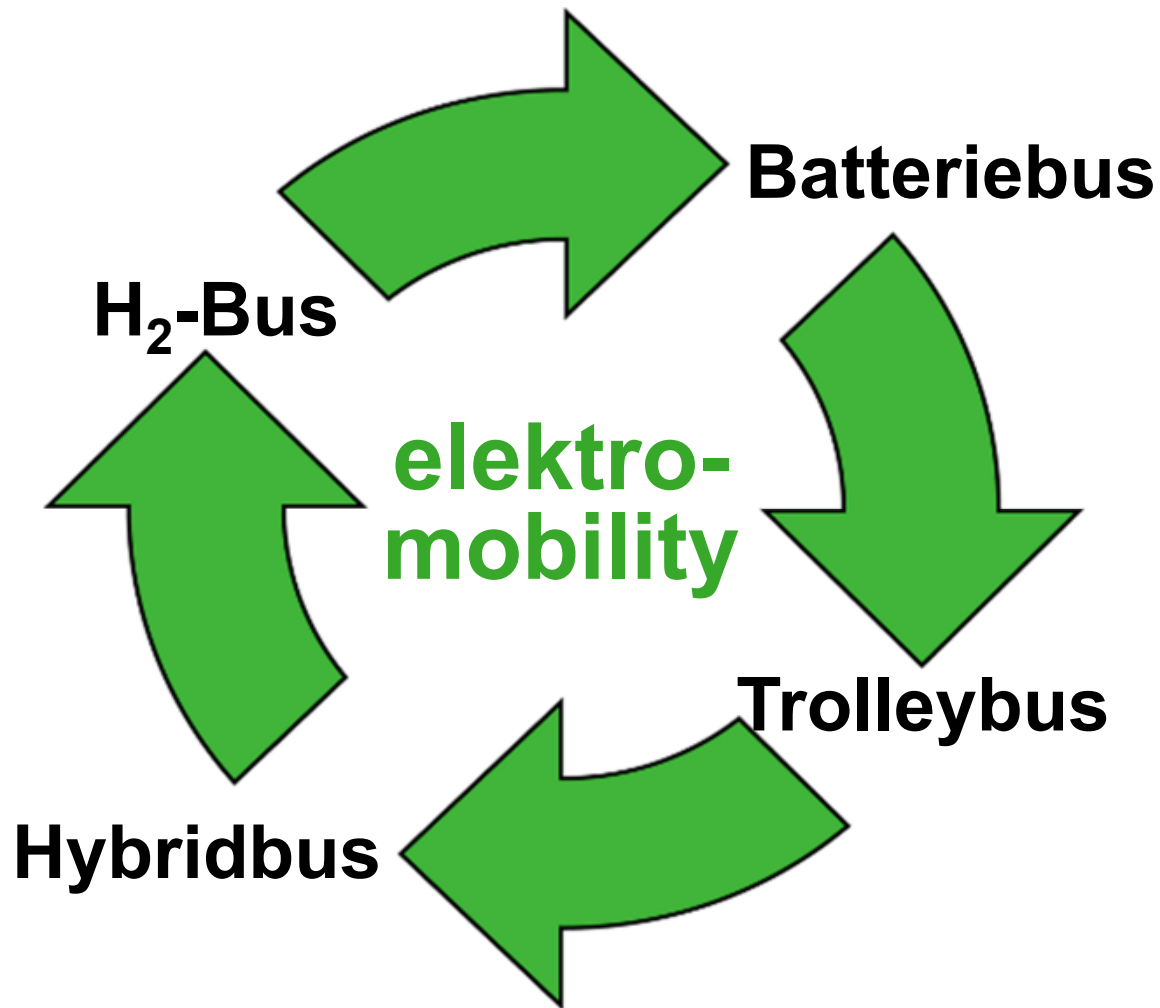
Voltage: DC 350V to 700V

Efficiency: 90% (inverter, ultra cap)

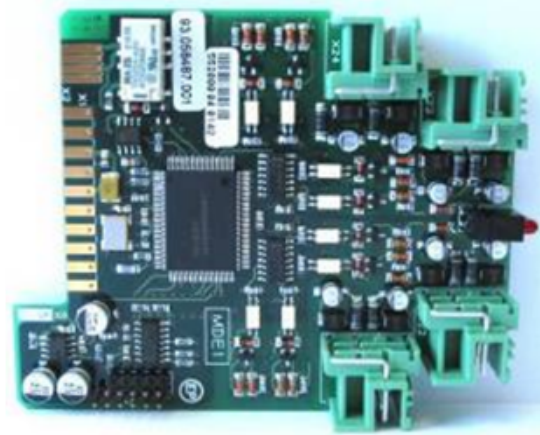
Dimensions: 2027 x 535 x 1120mm



Vossloh-Kiepe-Hybrid-System
Synergy



Efficient in Public Transport – Serial Hybrid Traction Systems Modular Control Units



Electronic Control Unit

- ▶ Modular structure
- ▶ Design for operation in streetcars (LRVs) and buses
- ▶ High safety level and service friendly
- ▶ Efficient failure analysis due to up-to-date diagnosis system based on Windows
- ▶ Transfer of diagnosis data via Kiepe W-LAN

Efficient in Public Transport – Serial Hybrid Traction Systems

Hybrid-Trolley Milano

Vehicle:

- ▶ Typ: Van Hool AG300T
- ▶ Length: 17,55m
- ▶ Equipment: air conditioning, 4 doors
- ▶ Speed: 60km/h (limited)

Traction system:

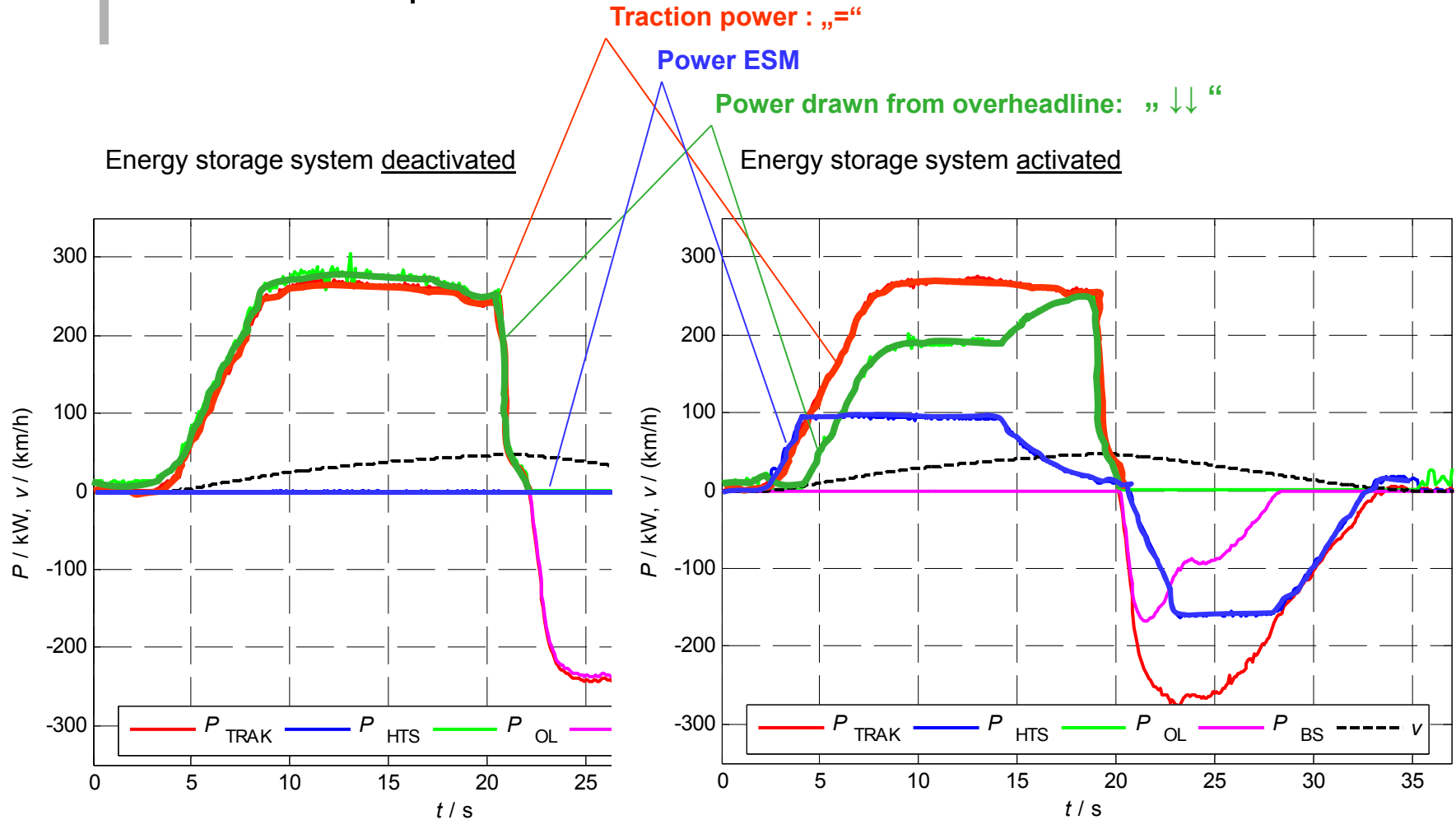
- ▶ Typ: Kiepe Hybrid Trolley
- ▶ Power: 240kW
- ▶ Energy storage system; Kiepe ESM101
- ▶ APU 100, EURO5



Efficient in Public Transport – Serial Hybrid Traction Systems

Hybrid-Trolley Milano

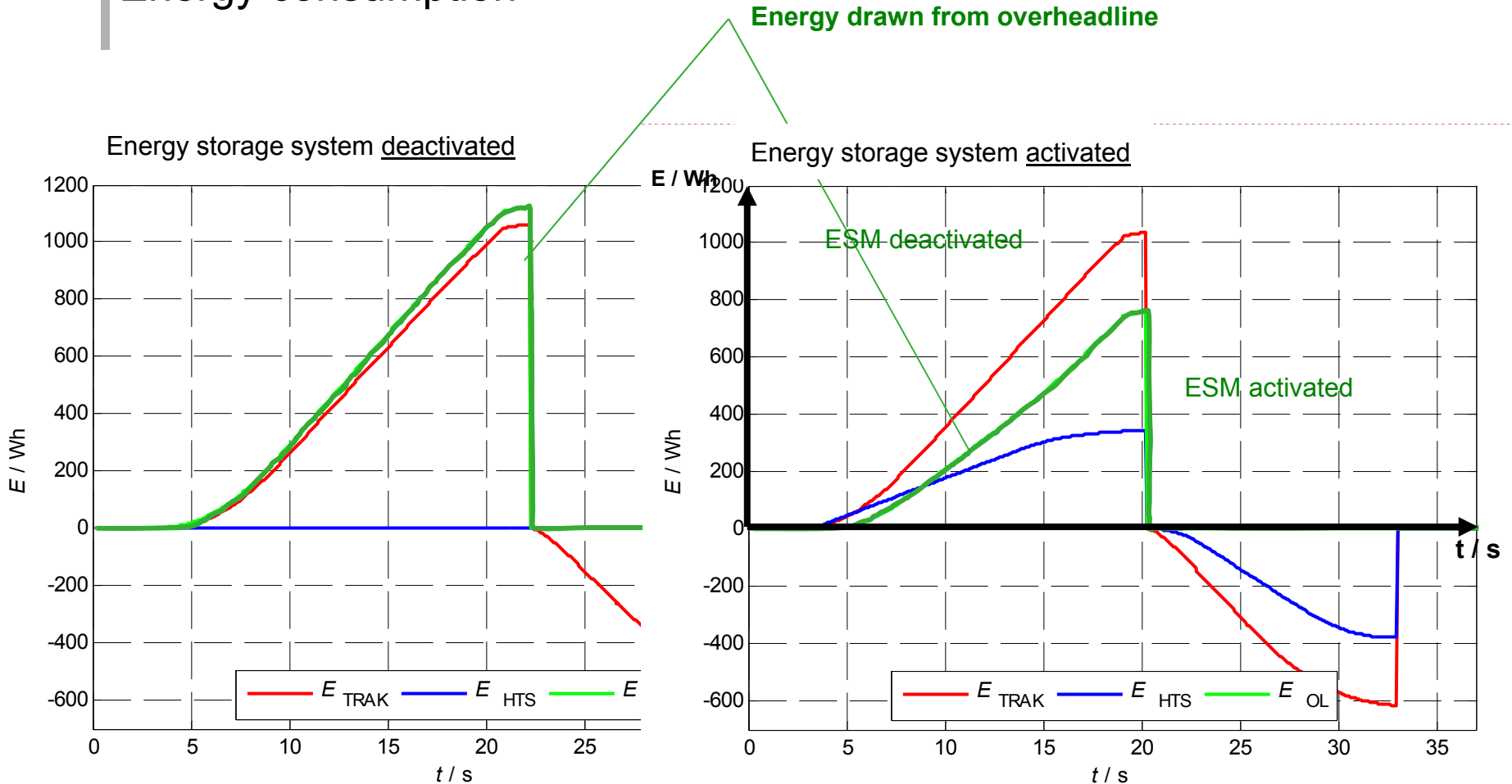
Power consumption



Efficient in Public Transport – Serial Hybrid Traction Systems

Hybrid-Trolley Milano

Energy consumption



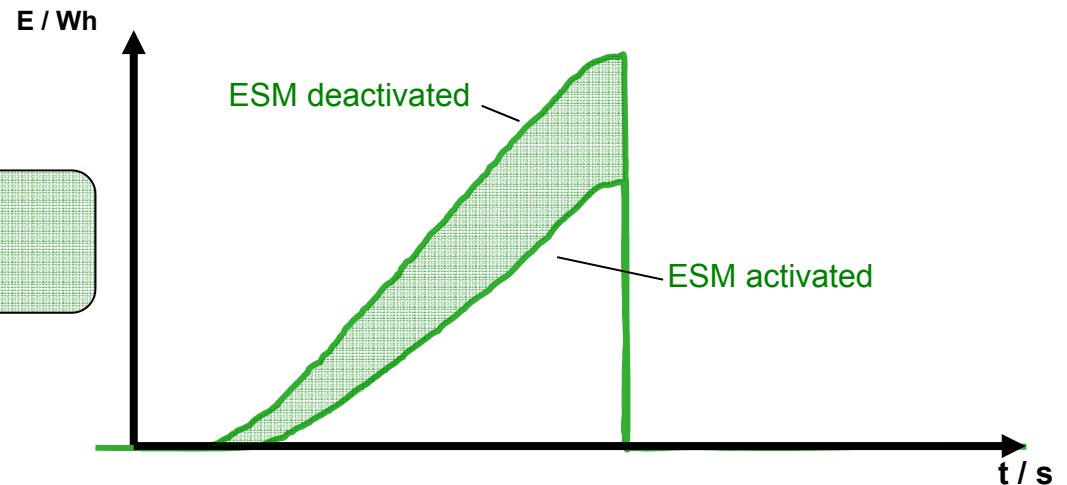
Efficient in Public Transport – Serial Hybrid Traction Systems

Hybrid-Trolley Milano

Energy consumption

Energy drawn from overheadline

Saved energy approx.:
32 %



Efficient in Public Transport – Serial Hybrid Traction Systems

Energy Management Supported by GPS



- ▶ Software for support of system efficiency
- ▶ Energy management, pre-calculation of required energy
- ▶ Localization of the vehicle
- ▶ Optimization for local conditions
- ▶ Reduction of noise emissions

Efficient in Public Transport – Serial Hybrid Traction Systems

Hybrid Technology, Environmental Aspects

The Vossloh Kiepe Hybrid Trolley Bus Technology represents the highest level of environmental friendly transport technology

- ▶ Full electric driven vehicle
- ▶ Electric braking system with recuperation and storage of braking energy
- ▶ Minimum of energy consumption
- ▶ Minimum of emissions
- ▶ Low noise emissions
- ▶ Reduced particle emissions
- ▶ Reduced CO2 emissions
- ▶ Zero emission driving possible
- ▶ Upgradeable with fuel cell technology



Thank you for your attention!



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