evs 27

The 27th INTERNATIONAL ELECTRIC VEHICLE SYMPOSIUM & EXHIBITION

BARCELONA
17th-20th November 2013

Unplugged

EV's & Charging from a Commercial vehicle perspective

Roy Johansson Volvo Group Trucks Technology

Organized by Fira Barcelona avele

Hosted by AVERE mea Ajuntament de Barcelona

In collaboration with EVAAP EDTA

Supported by European Commission

Commercial EV compered to car

- 4-8 times higher Energy consumption per km (electric city bus typically 1.3 kWh/km)
- Typical yearly driving distance up to 100 000 km. (urban vehicles usually < 30 000km)
- High energy, power and daily use => severe battery req (energy throughput often >10 times higher per year).
- Commercial vehicle customers used to calculate TCO => easier to justify high capital investment when low operating cost .
- Not relying on public charging infrastructure (until en-route charging possible?)
- Charging power for in-use charging typically >200 kW.

EV Motivation

Pros

- Efficiency
- Energy cost
- CO2 emissions
- Energy supply
- Noise
- Electricity global ”fuel” quality
- Realistic for large scale zero emission transport system

Cons

- Vehicle price (battery cost)
- Driving range (battery capacity)
- Load capacity (battery weight)
- Fueling/charging time

Charging challenge regardless of battery size

Time to charge 240 km		Energy storage for 240 km
5 minutes		*150 kg diesel-tank*
7 days		*> 5 ton battery*
9 hours		*> 5 ton battery*
4 hours		*> 5 ton battery*

Charging/battery trade-off

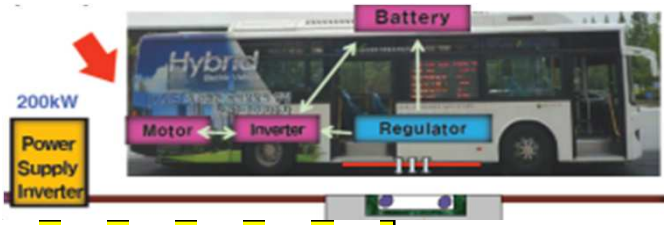
Conventional

240 km = 140 liter Diesel *(90 liter if Hybrid)*

240 km = 0.5 MWh electricity *(> 5 ton battery)*

En-route static

24 charges @ 250 kW for 5 minutes = 0.5 MWh
300…400 kg battery needed



En-route Dynamic

Continuous charge @ 40 kW for 12 hours
<100 kg battery needed

Conclusion
With En-route charging

~~Cons~~ => Pros

- Vehicle price (battery cost) **Good**
- Driving range (battery capacity) **Good**
- Load capacity (battery weight) **Good**
- Fueling/charging time **Optimum**

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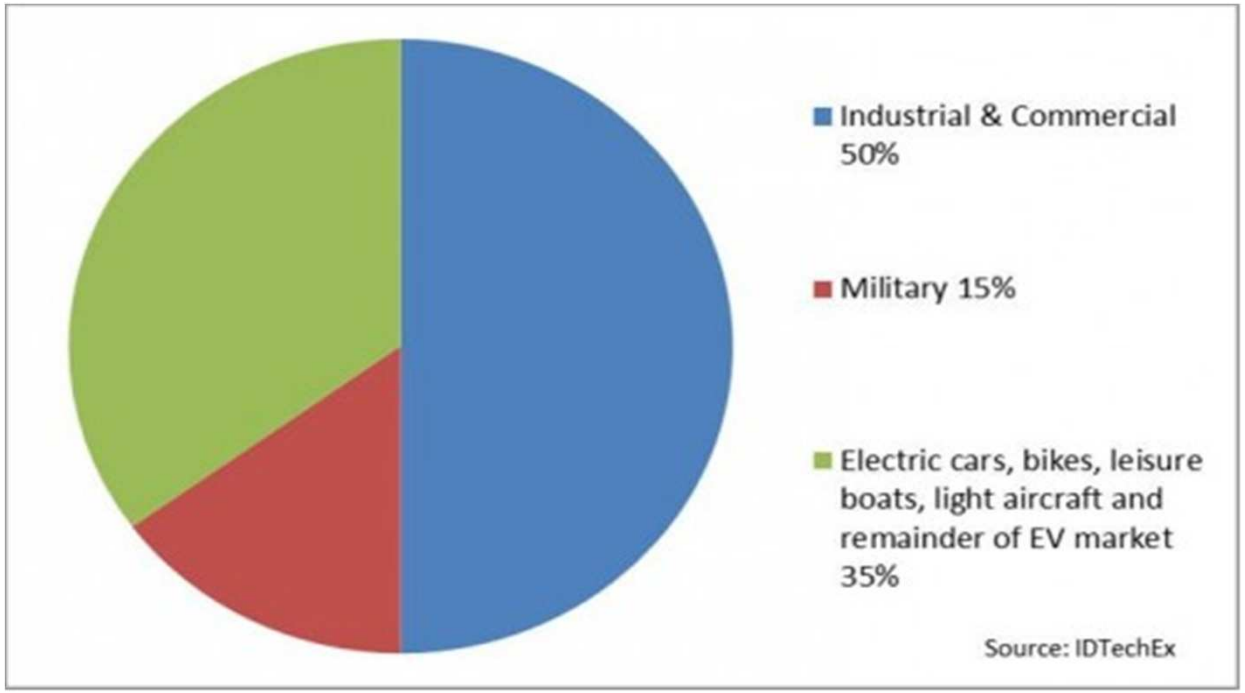
The total HEV and BEV market value in 2024



Commercial vehicles are the winners!

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Thank You!

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