

ULTRA CAPACITORS ELECTRIC BUS

No Range limit – No Pollution – No Batteries



Electric buses based on Ultra Capacitors (UC) have been operating successfully in Shanghai city for 7 years and accumulated more than 8 million km.

THE RISE OF ELECTRIC BUSES

- China is preceding the West in clean public transportation.
- Many of China's cities already are successfully operating e-buses as part of the city public transportation system. This trend is picking up rapidly.
- Electric buses are a fact and, no doubt, the trend of the future urban public transportation.

WHY E-BUSES?

- World-wide non-conciliatory growing demand for “cleaner” personal and public transportation.
- Readiness of governments to invest enormous capital in any reduction of pollution.
- No doubt – the trend of the future.
- Electric motors are much more efficient than diesels.
- Interesting business opportunity.
- Great saving in energy cost.
- Great saving in bus maintenance cost.
- Great saving by not building and maintaining of trolley-buses & trams expensive street infrastructure.

ENORMOUS SAVING OF ENERGY PER KM

- Average fuel consumption of a diesel city bus is 0.4 – 0.8 liter/km.
- E-bus consumption for each km is 0.6 kWh, and with A/C 1 - 1.2 kWh.
- In most of the world's countries, operation of electric buses might save the operators significant sums of money due to the much lower cost of the required electrical energy vs. the much higher cost of fuel for each km.
- The most important task and target is to reduce the pollution inside the cities. Saving of energy cost is just an extra benefit.

ENORMOUS SAVING IN MAINTENANCE

The maintenance cost of an e-bus is significantly lower than of a diesel bus:

- No internal combustion engine.
- No gear box.
- No exhaust system and no catalytic convertor.
- No cooling system, radiators, etc.
- No fuel injection systems.
- No oil, fuel and air filters required.
- No timing and driving belts.
- No need for urea tank and injection system.

SIGNIFICANT REDUCTION OF POLLUTION

- Ideal burning of diesel produces 2.6 kg of CO₂ per 1 liter – 2.2 kg CO₂ per 1 km.
- Production of 1 kWh electricity produces 0.8 kg CO₂ in coal & oil power stations and 0.52 kg CO₂ in gas turbine power stations – 0.8 Kg CO₂ per 1 km.
- E-bus will not pollute at all in the city, and will produce only about 1/3 CO₂ vs. the diesel buses.
- There will be significant national saving of energy.

THE IDEAL SOLUTION FOR CITY PUBLIC TRANSPORTATION – UC E-BUS

- Contrary to passenger cars, city buses travel in fixed routes. This enables effective and relatively low cost electrical charging infrastructure.
- The city line terminal (initial bus stop) is equipped with automatic charging system. The UC e-bus is charging during its stay in the terminal for a few minutes and is able to drive along the whole route.
- One charging station can serve all the buses operating on this city line.



UC e-bus while charging



UC e-bus while charging

Inside the UC e-bus. Low floor, airsuspension, luxurious, silent, powerful air-condition, Wi-Fi,



Pantograph of UC e-bus while charging





Only 6 m electric wires on top of the terminal stop

THE IDEAL SOLUTION FOR CITY PUBLIC TRANSPORTATION – UC E-BUS

- Low curb weight -
480 Kg UC will enable 10Km between charging.
960 Kg UC will enable 20Km between charging.
1440 Kg UC will enable 30Km between charging.
- Quick charge - 3-7 minutes charging in the terminal (beginning of the line) will enable driving 10km – 30km without charging.
- No range limit - the UC e-bus can follow its route around the clock without any distance limitations.
- Low infrastructure cost - only one charging station in the night parking lot and in each line end will do.

ADVANTAGES OF UC OVER BATTERIES

- No range limit.
- Lowest curb weight – highest passengers load capacity.
- Lower e-bus cost vs. batteries bus one.
- Regular inner city bus design.
- Lower investment in infrastructure (only one charging unit for each city line).
- No explosion risk in cases of impact, quick discharge, etc.
- Low temperatures affect neither the performance, nor the efficiency or output of the UC. Can perform with full capacity even at - 25°C.
- No need to warm batteries storage cabins.
- Longer life-span: about twice as long as batteries.

UC TECHNOLOGY

- Successfully operated in Shanghai's public transportation for 7 years - 8 Million km accumulated.
- Great success while operating during the great EXPO in Shanghai 2010.
- Now, upon achieving full compliance with the EU bus standards (WVTA), will start exporting to the West.
- Future UC developments could be integrated into the current models and will not require new buses.
- Safer than any other bus (gas, diesel or batteries).



**Service-free 21 kWh basic
UC pack (less than 1 ton)**

The UC pack in the
back of the bus





**The New UC E-bus Model for EU
Low floor + kneeling + EU Homologated (WVTA & EMC)**

FUTURE MODEL –BRT DOUBLE & TRIPLE ARTICULATED UC CITY-BUSES 19M' – 25M'



The design of the new 8.4 meters, low floor UC e-bus



New wireless electric city train.

Built by Alstom in Shengyang – China as a 10 Km extension to existing line.

The wireless UC system enable the train to run up to 20Km without any external electric upper wires.



The city electric train while using the old technology with the upper electric wires infrastructure.



The city electric train while running in the new line using the UC without the external upper wires.



Aowei's definite advantages vs. the world's leading ultra capacitors

The function and its values	The world's leading UC producers	AOWEI	In order to provide Aowei's values others will need
Capacity of the Module	14.4 kWh	45 kWh	45 kWh
Module's weight	4,100 Kg	1,800 Kg	12,810 Kg
Wight/kWh ratio	7.11	1	
Module's volume	5.5 M ³	2 M ³	17.3 M ³
Volume/kWh ratio	8.6	1	
Cells in each module	6,880	2,160	21,500 cells
Cells number/kWh ratio	9.95	1	

In order to provide the same capacity of Aowei's module, other companies will need to provide modules of 7 times the weight and 8.6 times the volume !!!

THANK YOU FOR YOUR ATTENTION!

Chariot Motors
info@chariot-motors.com

