

# Tony Wright Technical Manager Metroline Travel

First pure electric  
double deck buses on  
streets of London



# Metroline

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COMFORTDELGRO

# Comfort Delgro

- 8 countries - 43,000 vehicles
- Singapore (SBS Transit, CDGE & MRT)
- UK (Metroline, Westbus, NAT, Scottish Citylink, Cityfleet taxi and limousines)
- Irish Citylink
- CDC Australia ( largest private operator)Swan taxis
- Vietnam, Cambodia, Malaysia and China

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- Metroline Current Fleet – circa 1750 vehicles
- 14 sites in London, refurbishment centre in Bucks
- Split 65% D/D to 35% S/D
- 42% Volvo, 45% ADL, 13% NRM, Scania, Optare, BYD
- 600 hybrid double decks
- Hydrogen fuel cell role out expected in 2020

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# Electric Vehicles



- 5 BYD D/D at Willesden
- 23 BYD/ADL S/D at Holloway
- 68 D/D vehicles due 2019
- Longest duty is expected to be 140 miles on routes won so far

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# Infrastructure upgrades

- UKPN – Power available/secure. Can the grid support your requirements?
- Long lead times for quotations, short period for acceptance. Some grid upgrades being quoted at 5 years or more
- Local power operator capable for contestable/ non contestable works
- How far does the power have to be picked up from?
- Power into the garage - Sub station required/ Space available?. Location of charging equipment, H&S considerations.
- Preparation: large amount of research required, to include route length, topography, anticipated scheduling, charging strategy, and charging eqpt locations
- Smart charging strategy – dependent on SOC
- Changes to operation/additional buses.
- 2 current projects will cost around £1 million at PB and £2 million at HT

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# Maintenance requirements

- Commonality with standard vehicles in as many areas as possible. Body and chassis componentry, ramp, doors, steering & axle etc.
- Maintenance schedule should be similar to standard buses, but will develop as experience is gained.
- No aftermarket for large electrical parts will be an issue as we see with Hybrid
- 4hr Single charge 18 hrs service, varies across different brands. AC or DC?
- Reg braking - kinetic energy to electricity is an essential part of the 'fuel' saving strategy
- ZF front axle BYD rear
- Two wheel hub motor – max power 90kW, options for new suppliers into the market

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# In service performance: Energy consumption, mileage operated

- Proto type - 87% availability, main upgrades
- Suspension issues – upgrades on rear and front suspension
- Several versions of electrical controls and hardware have been trialled on the development models. Constant software tweaks to enhance performance. Vehicles have regularly managed 16 hours continuous usage
- These vehicles are currently operating on a weight dispensation of close to 21 tonnes on 2 axles. The vehicles in build will comply with current UK gross weights.
- Consumption is around 1.5kw/h per mile on single and 2.1kw/h on double deck vehicles.

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# 2019 - Roadmap to zero emissions

- 16 Euro 6 S/D
- Continued Hybrid investment 69 vehs in 2019
- EV's
- 37 BYD/ADL D/D at Holloway – June 19
- 31 Optare D/D at Potter Bar – June 19
- Fuel Cell
- 20 Hydrogen D/D 2020
- Electrification plans for depots – surveys/ power availability, on site power storage, routes split between depots, en route charging possibilities. Consideration for timescales and total costs v benefits at all sites, and ROI.
- Needs wider government support, to speed up the whole process.