Operating Hydrogen Buses and Infrastructure

An Operators Perspective

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Metroline – Who are we?

Overview

- London bus operator with c. **16%** market share
- Employs over **5100** member of staff:
  - almost **4500** drivers
  - over **250** engineers
- Operate across **14 garages** across north-west London
- Currently operating **c.1500** buses across **92** routes for Transport for London
- Fleet includes **720** Hybrid, **91** battery electric and **20** H2 buses with a further **88** ZE buses on order
- First movers and **early adopters of low and zero emission bus technology including the UK first EV and H2 double decker**
- Operated over **6.5m** zero emission miles, removing **6,600** tonnes of carbon from the atmosphere

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Current Hydrogen Fleet - The what and whys?

Since 2021, Metroline has operated fleet of 20 wright bus hydrogen fuel cell buses and utilised a NEL refuelling station with hydrogen provisions provided by Ryze.

The Route

- All 20 buses were originally deployed to the route 7 – East Acton to Oxford Circus
- This route was selected for:
  - Operates within the ULEZ
  - Duty cycle
  - 24 hour operation
  - Reduced the need for EV recharging spares
- Post COVID, TfL reduced the frequency on the route and now six buses operate on route 245

The Garage

- A garage short listing evaluation was undertaken based on the following key criteria:
  - Proximity to a transport hub
  - Not within a heavily built up area
  - Vehicles to be stored outside
  - Space for a two pump delivery fuel station
  - Suitable land lease term or ownership
  - Route where EV could be challenging to operate due to range limitations
- Perivale was deemed the most suitable garage

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Current Hydrogen Fleet - Performance

As we have experience with our EV fleet, there have been some teething issues, however performance of the buses have been encouraging

Consumption

- We are seeing consumption of ***8kg/100km***
  - *Better than data modelling had suggested*
- We can see a range of up to ***250 miles*** on a fuel tank of hydrogen
  - *Compare this to a range of **c.110-150 miles** on a full battery charge for EV*

Reliability

- We have had some issues with both the buses and station resulting in them being off the road
- However, when in service we have seen impressive reliability and performance from the buses
- We have seen fewer manual interventions from our engineering and operational staff to keep the buses in service (*not running other buses out*)
- Also, fewer breakdown recovers back to the garage than we have experience from our EV fleet

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Implementation and Operational Challenges

Challenges

Cost:

- Remains higher capital investment
- Fuel cell refurb and warranties
- Need parity to EV without support funding

Public perception of hydrogen safety:

- The word *'Hydrogen'* scares some people due to lack of knowledge and understanding
- There needs to be greater public education and engagement

Planning and Approvals:

- Permissions and approvals required from local authority and landlords

End to End Supply Chain

- Limited options for fuel and equipment
- Green Hydrogen *(which can support the business case)* is challenging to source within the UK
- There needs to be a diverse, competitive and motivated supply chain

Safety:

- Limited sources of information and certification
- No national standards (international just as vague)
- Finding the 'middle ground' between safety and operational requirements

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Thank you

Any Questions?

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