Integration of e-bus into Bus Fleets: A UK view

Eliptic Final Conference, Bremen

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Low Carbon Vehicle Partnership
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UK Bus Market Trends

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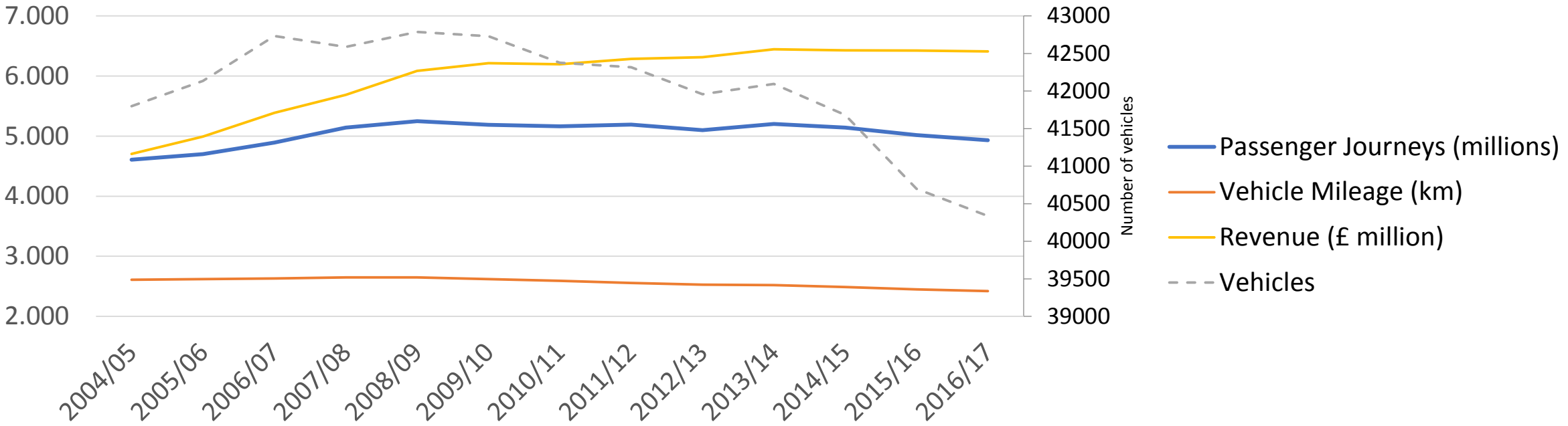
In 2017/16: UK Population = 66 million //Total number of buses in UK ≈ **40,000 = 5 Billion Passenger Journeys**

≈ **10,000 buses** in London (25%) , **2,200** million passenger journeys (44%)

General -1% decline year on year for last 5 years in bus mileage, passenger journeys and vehicles in-service in UK.

These trends put off commercial operators from investing in e-buses due to initial capital cost, uncertainty in battery lifetime and replacement costs. Meeting Euro VI for Clean Air Zones is immediate pressure in UK.



UK Low Carbon Bus Policy Evolution

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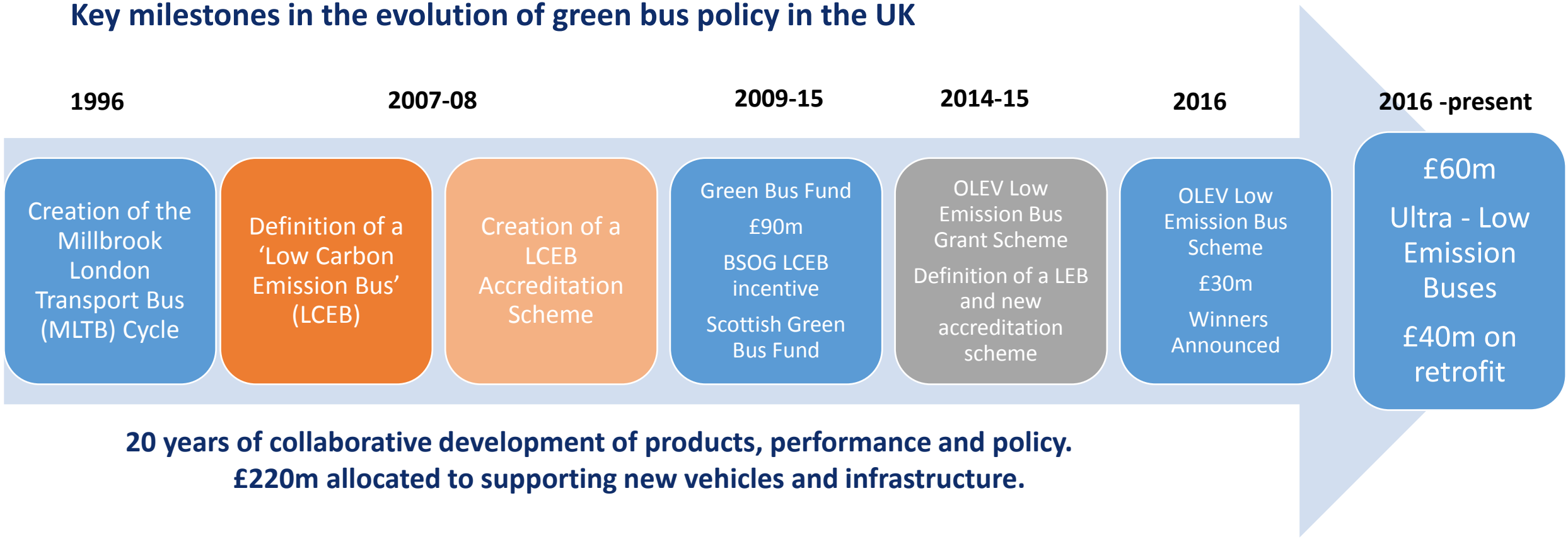
Key milestones in the evolution of green bus policy in the UK



20 years of collaborative development of products, performance and policy.
£220m allocated to supporting new vehicles and infrastructure.

Technology breakdown of UK Market

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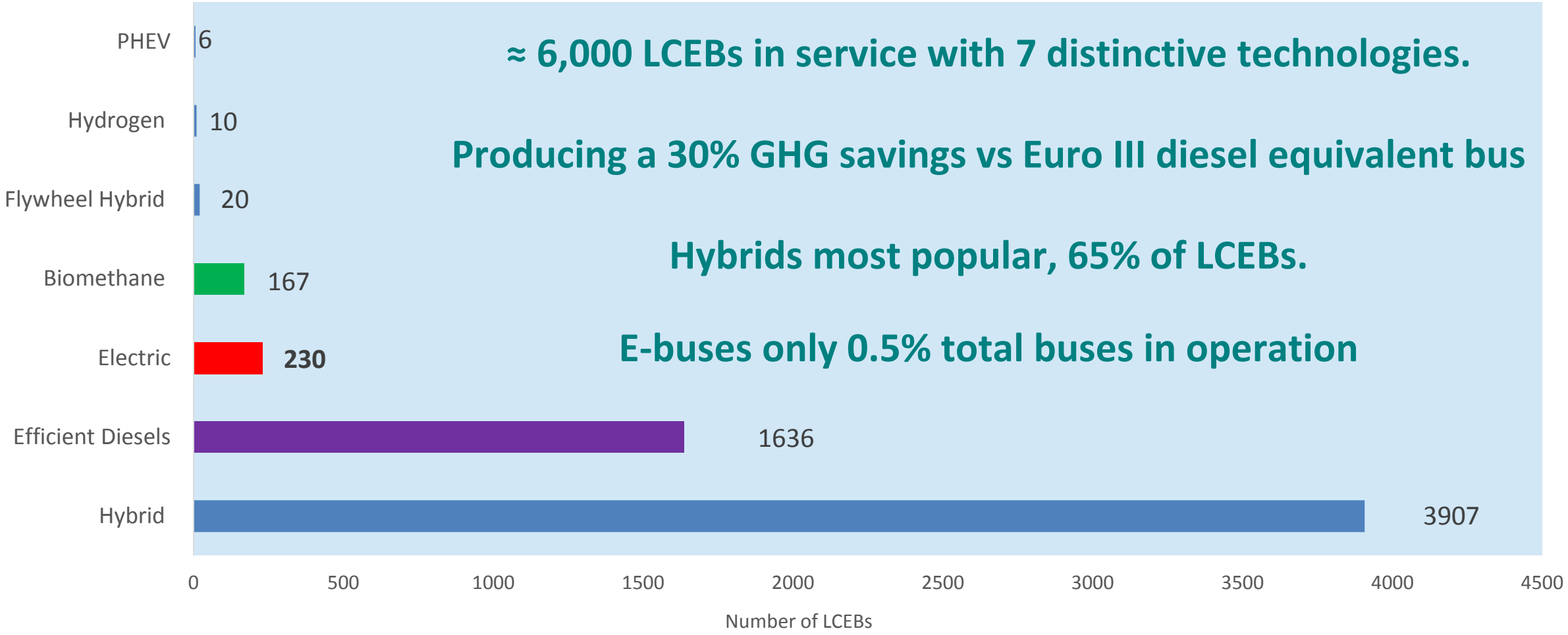

≈ 6,000 LCEBs in service with 7 distinctive technologies.

Producing a 30% GHG savings vs Euro III diesel equivalent bus

Hybrids most popular, 65% of LCEBs.

E-buses only 0.5% total buses in operation

Regional Locations of e-Bus fleets

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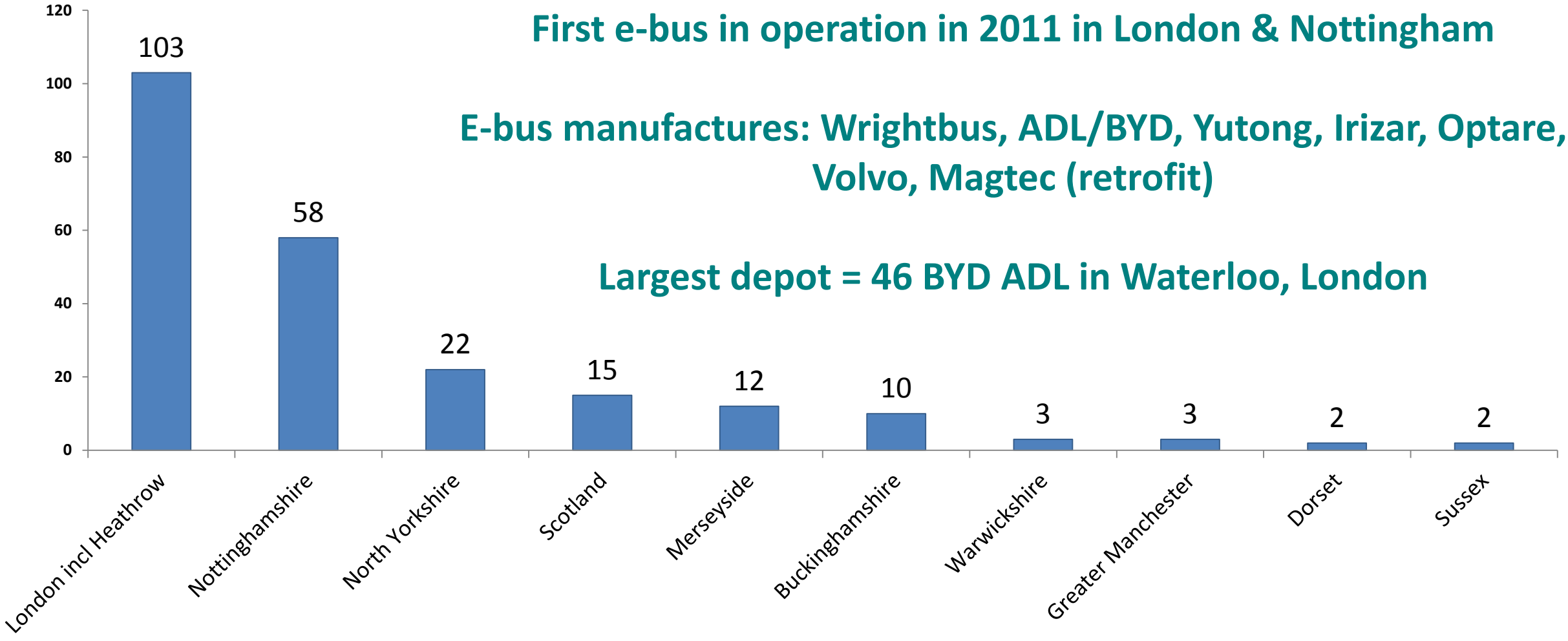

First e-bus in operation in 2011 in London & Nottingham

E-bus manufactures: Wrightbus, ADL/BYD, Yutong, Irizar, Optare, Volvo, Magtec (retrofit)

Largest depot = 46 BYD ADL in Waterloo, London

E-bus: UK Operational Trends

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1. Big push from local authorities for ZE technologies to tackle GHG emissions & NOx / PM.
2. Operators beginning to trial but apprehensive to move forward independently (financially)
3. 'Easy win' routes chosen in early deployment
4. Big battery – long range favoured over Opp Charge (less barriers to infrastructure deployment)

Charging infrastructure / Charging Regime (no standardisation drive)

- Depot based charging favoured – plug-in rather than pantograph
- 3 x Inductive projects: Milton Keynes with 22 buses, 5 PHEVs using inductive in London & Bristol.
- OppCharge project in Harrogate with 8 x Volvo, London to get pantograph - Volvo Double Deck PHEV

Battery Degradation

Operators very careful not to push battery to hard, very little degradation seen to date on 4/5 year vehicles – may change as we see vehicles deployed on more challenging routes.

Ultra-Low Emission Bus Scheme: £48m for vehicles and infrastructure

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OEMs must test vehicle over representative test cycle in a climate controlled test chamber to qualify for funding.

New Ultra-Low Emission Bus definition

30% Well-to-Wheel Greenhouse Gas savings vs Euro VI diesel bus of equivalent size.

Must have **Euro VI certified** engine or equivalent emissions

Funding for incremental cost difference – max 75% (2018 -2021)

- £500 / zero emissions kilometre, up to 100 km, up to 25% incremental cost
- £150 / g CO2e /km saved vs diesel, up to 50% incremental cost
- 75% funding for supporting infrastructure

More info: https://www.lowcvp.org.uk/Hubs/leb/Home.htm

UK eBus Summit 2016

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Thank you for listening, hopefully see you all soon!

For updates and developments in the uptake of e-Buses in the UK, Visit LowCVP's **Low Emission Bus Hub**

https://www.lowcvp.org.uk/Hubs/leb/Home.htm

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