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Zemo Partnership consultation response to Ending of the sale of new diesel buses in England

The Zemo Partnership (previously Low Carbon Vehicle Partnership) is a public-private partnership established in 2003 by UK Government to accelerate the shift to lower and now net-zero carbon vehicles and fuels within the road sector, and to create opportunities for UK business. Around 200 organisations are engaged from diverse backgrounds including automotive and fuel supply chains, vehicle users, academics, environment groups and others. The Partnership became a not-for-profit company limited by guarantee in April 2009 and receives roughly half its funding as a direct grant from the DfT, together with funding directly from Transport Scotland and all member companies

A workshop to discuss this consultation and proposals was held on the 7th April with 48 members in attendance, including bus manufacturers and both small and large operators. The workshop sought to draw out the key barriers and opportunities to setting an end date to the sale of new diesel buses as well as achieving a fully decarbonised bus fleet. However, this submission and suggestions included are from the Zemo Partnership secretariat, and do not represent the specific positions of any one member.

This document presents the high-level elements that should be considered by DfT and OZEV in setting an end date to the sale of all new internal combustion engines (ICE) buses, not just diesel. There are two supporting slide decks also attached which provide greater depth on cost of zero emission buses (ZEBs) and infrastructure and other items discussed below.

Executive Summary

The Zemo Partnership Bus Working Group has worked directly with the DfT's Green Bus Policy team over the last decade on designing capital grant schemes to drive the uptake of cleaner and greener buses. The group has developed testing and accreditation criteria for manufacturers to meet to qualify for capital grants and BSOG LCEB support. This historic work provides the Bus Working Group with a large amount of data and detailed understanding about the performance of new technologies and the requirements of bus operators to deliver effective services.

Over the last decade there have been a range of technologies and fuels funded to decarbonise the bus fleet, including hybrids (non plugin & plug-in), biodiesel, compressed biomethane, battery electric, hydrogen fuel cell buses. The pace of technological development in recent years have seen it possible for many urban bus services to be performed by zero emission technologies, namely battery electric and hydrogen. Government ambition has developed alongside technology, setting a target of 4,000 ZEBs in England by 2025. Currently there are 240 ZEBs in service in England.

Simultaneously the Bus market itself and city authorities are setting ambitious commitments for City centres and Bus fleets giving Zemo confidence that an ambitious approach to new zero emission bus adoption is possible and desirable.

To achieve this immediate target and the long-term ambition of a fully decarbonised ZEB bus fleet, Zemo propose the follow proposal for the end of sale of diesel buses:

- All new buses registered from 2030 should be zero emission. With up to 5 years earlier ICE phase out dates in specific areas/operations (eg city centre)

Key Considerations

Zemo have highlighted the following points for DfT to consider:

- All ICE combustion powered buses should be phased out, not just diesel. Not specifying this may lead to the uptake of alternative combustion engines such as compressed natural gas buses, which is not achieving the target

Zemo believe there is an opportunity to separate out urban and rural services, however the industry believes this would be challenging as vehicles service different routes and defining urban and rural is challenging. Our initial proposal was as follows but will need further development and discussion to provide clarity on urban/rural definitions.

- All buses registered on urban bus routes (<200km) to be zero emission from 2025.
- All buses registered in rural bus routes (>200km) to be zero emission from 2030

Zemo also believe there could be a roll for plug-in hybrid/Range extender buses with significant zero emission capability, to support longer routes and future proof depots between 2025–2030. As with cars and vans, plug-in hybrids could play a role as an interim to support longer routes sooner, that cannot be supported by existing ZEB range and where opportunity charging is not possible or significantly more expensive. However there are concerns that hybrids are an interim technology and require double the maintenance of diesels/ZEBs. There is also a concern around NOx spikes following prolonged periods of ZE mileage as the diesel SCR system cools down NOx abatement is reduced.

- Smaller buses below 22 passengers should be considered and embraced in future ZEB proposals

Currently DfT support is focussed on buses with capacity for 22 passengers and above. New innovative services such as demand response travel (DRT) and rural services may be more suited to smaller vehicles, however these are not yet supported by BSOG or ZEBRA. Zemo believes that vehicles operating on registered bus routes should be eligible for the similar incentives, regardless of their size. Further work to develop a Zero Emission Mini/midibus definition for use for future ZEBRA/BSOG activity is underway and requires further development with DfT and industry.

- Supply of ZEBs is not seen as an issue, however operator financial standing/capital capacity will be a barrier. More ambitious ICE end dates will require greater levels of funding or fiscal measures and holistic approaches to modal shift to promote ridership and support a healthy bus industry.

Battery supply requirements for 2,000 buses registered annually with 350kWh of battery capacity is equivalent to around 14,000 cars with 50 kWh of battery capacity. In 2020 over 100,000 BEV cars were registered in the UK with estimates of double that for 2021. Discussions with Bus manufacturers suggest supply of zero emission buses will not be a limiting factor to uptake. However, falling passenger patronage and impacts of Covid have severely limited operators' ability to purchase new zero emission buses, particularly to own the asset outright as is traditional with diesel vehicles. In the short term there is a clear necessity for the government support to help operators purchase ZEBs and infrastructure, as well as a fundamental restructure of BSOG. This may need to be in the order of £500-£1bn. Germany recently increased its support for ZEB rollout to around €600m.

The long term sustainability of a commercial bus fleet in England free of purchase subsidy will be dependant on a range of measures to encourage modal shift. Currently it is often seen as cheaper and more convenient to drive a car rather than catch the bus. Measures that discourage car use particularly in cities and make buses more attractive and relatively more affordable e.g. fuel duty revisions, parking levies etc. will enable a healthier, more profitable bus market that will be able to support subsidy free purchase of ZEBs.

- Restructure BSOG to favour support of ZEBs rather than reward diesel use.

BSOG provides 35p/litre diesel used, equating to around an average of 12p/km travelled for a diesel bus. Currently there is a BSOG LCEB incentive in place of 6 p/km which ZEBs are eligible for (as are some diesel powered hybrids and Biomethane vehicles). Given the higher purchase price a ZEB should be receiving support to make it significantly cheaper to operate than a diesel bus in order to encourage uptake. Zemo worked with Transport Scotland to develop a tiered and timed approach to distance based BSOG support, giving ZEBs initially 30p/km, now 20p/km, along with a base BSOG support of 14.4p/km. In the short term, simply improving the BSOG LCEB/ZEB offer would support a transition, without having to change the base diesel rate, which is particularly essential for smaller operators.

Zemo see capital grant support as bridging the upfront cost of ZEBs, while BSOG would support operators with expensive mid-life refurbishment. Zemo have previously held workshops and submitted a range of evidence, TCO models and operations for reforming BSOG, and are keen to continue to develop a solution jointly with the Department.

- Zero Emission at the tailpipe does not automatically mean improvements in well to wheel or life-cycle greenhouse gas savings. Use of green hydrogen in any ZEB is essential.

Zemo have evidence through the ULEB testing procedure that EVs running on grid average UK electricity achieve 49-70% WTW GHG savings vs conventional diesel vehicles. Here green electricity is not essential and GHG savings will continue to improve as the rapidly grid decarbonises. However we have not tested a hydrogen bus, to determine a robust comparison to a diesel. Based on calculations highlighted in the attached presentation, hydrogen buses must run on renewably derived hydrogen to provide a greenhouse gas saving compared with diesel. If fossil derived (Grey) hydrogen is used or indeed average UK grid electricity for electrolysis, then GHG emissions may actually increase. As such subsidies should actively encourage and monitor the use of green hydrogen going forward.

- Legacy diesel fleet can be decarbonised with biofuels and zero emission retrofit solutions.

The average life of a bus is around 15 years, which means that diesel buses are likely to be running in the 2030's and potentially 2040's. High blend renewable fuels such as FAME or HVO could be used to decarbonise the legacy fleet given the bunkered nature of Bus depot refuelling. Zero emission retrofit solutions (currently excluded from financial support schemes) may also be a cost effective solution of removing older diesel buses and transitioning to zero tailpipe emission quickly for operators who may not be able to afford new vehicles. Large operators and TfL are considering the potential of ZE retrofit currently. Zemo Partnership are supporting the DfT with a series of workshops to explore the roll of ZE retrofit for bus and better understand the barriers and opportunities for this solution. Zemo recommend a robust certification system ZEVAS (Zero Emission Vehicle Retrofit Accreditation Scheme) is developed to ensure quality and safety of retrofits prior to any financial support.

- There is likely a need for standards, particularly around EV chargers for buses to ensure competition between manufacturers in the market and support future vehicle cascading/flexibility.

With 1% of the existing bus fleet zero emission, the market is still developing. The European market is pushing standards in the direction of CCS Combo 2 DC chargers. Transport for London are also advocating operators adopt for this solution. However, there are concerns that some suppliers are limiting competition by installing chargers that are only compatible with one bus model. This could severely limit future cascading of vehicles and competition. Zemo are keen to monitor this situation and inform DfT through workshops and papers to ensure that government funding does not create a market monopoly. This is not likely to be an issue for hydrogen buses for which refuelling standards are currently more consistent

- A positive media campaign around the benefits of bus use (in particular Zero emission) should be rolled out.

Covid messaging was very clear around avoiding public transport at all costs. This messaging must be reversed through a positive messaging campaign around the benefits of public transport.