BSWB 29 - Evidence from: Zenobe Energy Limited

Senedd Cymru | Welsh Parliament

Pwyllgor Newid Hinsawdd, yr Amgylchedd a Seilwaith | Climate Change, Environment, and Infrastructure Committee

Bil Gwasanaethau Bysiau (Cymru) | Bus Services (Wales) Bill

1. What are your views on the general principles of the Bill, and is there a need for legislation to deliver the stated policy intention?

At Zenobe, we are market leaders in fleet electrification in the UK, Australia and New Zealand - supporting 120 depots and over 2000 vehicles globally. Since 2017 we've been working with operators to switch their diesel buses and coaches to electric at the lowest possible cost - increasingly we are working with HGVs too. Therefore, our approach in this consultation focuses on the intersection of franchising and the net-zero transition. We aim to explore how the Welsh Government can leverage franchising to transition the whole fleet to electric vehicles, which, with the right management and systems in place, can not only be more cost-effective than diesel but also help establish a world-class transportation system while delivering cleaner air for Wales.

While electric buses have a higher upfront cost (up to £300k more than diesel counterparts), their lower running costs provide material financial benefits. The investment in electric buses can (depending on the services involved) be recouped within eight years due to substantial savings in fuel and maintenance costs.

To demonstrate the cost of ownership points made throughout our response, Zenobe has conducted analysis based on a 100-bus electric fleet and depot vs diesel. This analysis shows that it is £9.6 million cheaper over 15 years to run the 100-bus electric fleet and depot vs diesel. Furthermore, an electric bus is assumed to be able to run 250,000 miles further than a diesel reducing the cost of the asset on a per mile basis further. Even at diesel end-of-life electric buses are already c. £96,000 cheaper per bus over the diesel asset lifetime. More information has been provided in our response to question 12.

Zenobe has served as the trusted electrification and financing partner for both Newport Transport Limited and Cardiff City Transport Services Limited, playing a key role in their respective zero-emission journeys.

At Newport Bus, Zenobe has designed, installed, financed, and continues to operate three phases of battery energy storage systems (BESS) and DC charging

infrastructure. This supports the operation of 57 Yutong E9, E10, and E12 electric buses, along with 4 Yutong TCe12 electric coaches. The on-site 430 kW Tesla BESS significantly accelerated Phase 1 of the project by mitigating limitations posed by a constrained grid connection from WPD/NGED at the time.
Zenobe also delivers a Battery Managed Service for all 61 vehicles, covering the financing of batteries and their replacements over a 16-year term. This includes comprehensive operational data and insights into battery health and degradation.
In Cardiff, Zenobe has delivered two phases of DC charging infrastructure to support 55 Yutong E10 and E12 electric buses. The Phase 1 works included the installation of a 1.8 MVA grid connection, effectively future-proofing the depot for continued electrification in Phase 2.
Both projects are prime examples of Zenobē's successful collaboration with municipal transport operators in Wales. By maximising the use of Ultra-Low Emission Bus (ULEB) funding, these partnerships have ensured the deployment of a significant proportion of Wales' electric bus fleet.
Franchising comes with implementation and delivery costs and challenges. To deliver the best outcomes for passengers, franchising should be recognised as a key opportunity to accelerate the transition to Zero-Emission Bus (ZEB) fleets. A clear and comprehensive plan must be in place for the transition to ZEBs, covering both financing and delivery.
Electrifying bus fleets presents an opportunity to save money for both government and operators. Substantial savings in maintenance and fuel costs are predicted for cities like Manchester and Liverpool, as well as smaller cities like Derby and Hull, which can be reinvested into improving services. Zenobe can provide specific analysis for Welsh regions with more information and we would encourage Welsh Government/Transport for Wales to engage with us on this.

2. What are your views on the Bill's provisions (set out according to Parts below), in particular are they workable and will they deliver the stated policy intention?

- **Part 1 - Key concepts and general objectives (sections 1 to 4)**

Zenobe has focused on the 2nd and 6th objectives, "continuously to improve the reliability, safety, affordability and accessibility of local bus services" and "reduce greenhouse gas emissions and waste from road transport" respectively.
We strongly recommend that the Welsh Government reassess its ambition and bring forward its target for ZEB adoption to before 2035-36. To achieve this Welsh Government/Transport for Wales should actively explore alternative ownership and financing models - expanded on below - that have accelerated the transition

in other regions of the UK and globally. These models could significantly reduce upfront costs and turbo-charge the adoption of Zero Emission Buses, ensuring Welsh Government/Transport for Wales leads by example in improving local bus services whilst reducing greenhouse gas emissions and waste from road transport.
To ensure that the proposed scheme delivers value for money, it is important for Welsh Government to carefully consider the full cost of purchasing and operating zero-emission bus solutions. This includes evaluating not only the upfront capital costs but also the long-term operational efficiencies, maintenance and lifecycle costs associated with fleets.
While electric buses have a higher upfront cost (up to £300k more than diesel equivalents), their lower running costs provide material financial benefits. The investment in electric buses can (depending on the services involved) be recouped within eight years due to substantial savings in fuel and maintenance costs. Over their 15-year period, operators could expect the Net Present Value (NPV) of electric bus fleet costs – a measurement of cash inflows and outflows – to be £160k lower than for a diesel bus fleet. (Please refer to our "Charging forward" report for further information on underpinning analysis).
In regard to purchasing vehicles, while capital funding has been available until now in the form of Welsh and UK Government funding, it will not be available in perpetuity and Welsh Government/Transport for Wales will need to consider financing if they are to switch from diesel to zero emission electric buses, as outlined in the Explanatory Memorandum. Enabled by the right arrangements, expert partners like Zenobe can mitigate and reduce delivery risks (delays and additional expense) from day one –enabling a greater number of electric buses to be rolled out.
Zenobe is eager to discuss the benefits of our Electric Transport as a Service (eTaaS), currently used in the West Midlands by National Express, which provides additional stability as the model makes it easier for vehicles to transfer between operators both during a franchise (to even out vehicle use between intensive and less intensive routes) and at the end of a franchise, where a smooth transition is essential to service reliability and customer confidence.
Electric buses offer several advantages that enhance the passenger experience compared to traditional diesel-powered buses:
Clean air: Electrifying bus fleets leads to cleaner air and significant reductions in greenhouse gas emissions. Electrifying bus fleets would also result in substantial reductions in particulate matter (PM2.5) and nitrogen oxide (NOx) emissions, which are associated with chronic disease, premature death, and excess costs to the NHS.
Quieter and Smoother Rides: Electric buses operate more quietly than their fossil fuel counterparts, creating a more comfortable environment for both drivers and

passengers.
Reduced Vibrations and Less Fatigue: Electric motors have fewer moving parts compared to internal combustion engines - they therefore produce less vibration during operation, reducing driver fatigue and discomfort, especially during long shifts.
Positive Passenger Feedback: In Gothenburg, Sweden, a customer satisfaction survey revealed that 94% of passengers responded positively to sound levels onboard electric buses, and 96% agreed that these buses contribute to a better environment.

3. What are your views on the Bill's provisions (set out according to Parts below), in particular are they workable and will they deliver the stated policy intention?

- **Part 2 - Functions of the Welsh Ministers relating to local bus services (sections 5 to 20)**

Zenobe has no views on this. We are supportive of any efforts that will encourage modal shift, improve the business case for continual investment in buses and accelerate net zero.

4. What are your views on the Bill's provisions (set out according to Parts below), in particular are they workable and will they deliver the stated policy intention?

- **Part 3 - Restriction on providing local bus services (sections 21 to 24)**

Zenobe has no views on this. We are supportive of any efforts that will encourage modal shift, improve the business case for continual investment in buses and accelerate net zero.

5. What are your views on the Bill's provisions (set out according to Parts below), in particular are they workable and will they deliver the stated policy intention?

- **Part 4 - Information and data (sections 25 to 31)**

Zenobe has no views on this. We are supportive of any efforts that will encourage modal shift, improve the business case for continual investment in buses and accelerate net zero.

6. What are your views on the Bill's provisions (set out according to Parts below), in particular are they workable and will they deliver the stated policy intention?

- **Part 5 – Local authority powers and duties (sections 32 to 34)**

Zenobe has no views on this. We are supportive of any efforts that will encourage modal shift, improve the business case for continual investment in buses and accelerate net zero.

7. What are your views on the Bill's provisions (set out according to Parts below), in particular are they workable and will they deliver the stated policy intention?

- **Part 6 – Miscellaneous and general (sections 35 to 44)**

Zenobe has no views on this. We are supportive of any efforts that will encourage modal shift, improve the business case for continual investment in buses and accelerate net zero.

8. What are the potential barriers to the implementation of the Bill's provisions and how does the Bill take account of them?

A key potential barrier to implementation is the risk of underutilising or excluding capabilities that have developed in the private sector over the last 5 years, particularly in financing, energy infrastructure and fleet management. To be effective, the Bill must retain flexibility and actively encourage models of delivery that allow private partners to co-invest and co-develop electric bus solutions

alongside local authorities and public transport operators, thus derisking the transition.
Delivering electrification at pace through franchising will require private funding and expertise - and partners like Zenobe have a proven track record of enabling government funding to go further and achieve greater impact, particularly through the mitigating technical and operational risk.
As demonstrated through Zenobe's work on ScotZEB2, where we supported a consortium of operators to secure £41.7 million in funding, enabling the deployment of over 250 electric buses and expanding Scotland's e-bus fleet by 40% by the end of 2026 – one year in, our projects are on track to achieve this with only a £30 underspend in year one. This approach highlights how our tailored financing and operational support can accelerate the decarbonisation of transport across the UK.
Private partnerships would enable Welsh Government/Transport for Wales to reduce risks such as asset management and delivering electrification infrastructure. Ensuring that the Bill's provisions enable private partnerships will be key to supporting risk managements/sharing structures that can address:
Infrastructure delivery risk mitigation: Expert build and project management across multiple stakeholders and suppliers (including DNOs) to minimise delays and therefore costs to the authority.
Ongoing battery monitoring: Zenobē tracks energy use and battery health to ensure optimal performance and adherence to warranty specifications.
Battery capacity guarantee: Zenobē ensures that the battery on board the bus will always have a minimum capacity, meaning that the electric bus will always be able to deliver the routes to which the bus has been allocated, providing peace of mind to the MCA.
Battery replacement risk removed: When the battery falls below the guaranteed capacity (usually c.80%), Zenobē covers the cost of its replacement which could be lower or higher than the original battery cost.
Second life to minimise environmental impact and reduce first life cost: The initial Zenobē batteries are, once taken off the vehicles, refurbished and repurposed in new applications, usually as portable power sources (generator equivalents) on construction sites, film shoots, events etc. This extends their lives by a further c.5 year, at which point they will be recycled. This extended life increases the carbon savings created by each battery and the assumed residual value of the battery for this application can reduce first-life procurement costs.
Energy cost risk mitigation: With uncertain markets and high usage at specific times of day, providing infrastructure design, power purchasing advice and charging software that minimises energy costs.
Service arrangements and financing: Our offering includes long-term financing

arrangements (15+ years) at competitive rates, with the option to structure the funding off balance sheet. This approach provides broader financial benefits, as we offer service-based arrangements rather than solely traditional lease financing. By ensuring the legislative framework is flexible, inclusive of partnership approaches, and supportive of long-term investment, the Bill can avoid key implementation barriers and ensure that electrification is delivered efficiently, sustainably, and at scale.

9. How appropriate are the powers in the Bill for Welsh Ministers to make subordinate legislation (as set out in Chapter 5 of Part 1 of the Explanatory Memorandum)

Zenobe has no views on this. We are supportive of any efforts that will encourage modal shift, improve the business case for continual investment in buses and accelerate net zero.

10. Are any unintended consequences likely to arise from the Bill?

The transition to electric vehicles represents a significant investment, with costs currently around £370,000 for a single-decker and £500,000 for a double-decker bus. To enable operators to commit to these investments, long-term security of revenue is essential.
Rather than using capital funding to purchase electric buses outright, Welsh Government/Transport for Wales should explore bespoke investment and shared ownership models as a means to fund ZEB fleets and, where possible, mitigate the technical and commercial risks of an accelerated decarbonisation programme.
Electric buses are a depreciating asset, meaning their value declines over time. Using capital funding to purchase them locks public money into assets that lose value, rather than investing in long-term infrastructure improvements that benefit the entire network. By investing in bus priority measures, passenger numbers increase due to more reliable, faster journeys and reduced congestion. See reference to our analysis above.
Higher ridership means greater fare revenues, which can then cover leasing costs for electric buses. This ensures that capital funding is used for infrastructure improvements that generate long-term benefits, rather than being tied up in vehicle purchases.
By prioritising capital funding spending on bus priority measures over direct EV purchases, Welsh Government/Transport for Wales can ensure public funds deliver lasting value, reduce financial risk and depreciation losses, and create a self-

sustaining funding model, where increased bus use helps fund fleet improvements.
This approach not only delivers the environmental benefits of electric buses but does so without compromising the financial sustainability of the network.
In the case of replacement risk, Welsh Government/Transport for Wales would need to cover the costs for each electric vehicle, leaving it exposed to volatile markets and potential cost spikes at a time when capital Government funding may not be available. This risk can be mitigated through a “battery as a service” model, which would provide Welsh Government/Transport for Wales with sufficient control to ensure service levels are maintained without the need for direct ownership and addition resources. Managing batteries within warranty and minimising battery degradation requires specialised expertise, time and tools, such as advanced battery monitoring software. In collaboration with Welsh Government/Transport for Wales and the service operators, Zenobe could provide its expertise through the managed service by offering:
Ongoing battery monitoring: Zenobe tracks energy use and battery health to ensure optimal performance and adherence to warranty specifications.
Battery capacity guarantee: Zenobe ensures that the battery on board the bus will always have a minimum capacity, meaning that the electric bus will always be able to deliver the routes to which the bus has been allocated, providing peace of mind to the MCA.
Battery replacement risk removed: When the battery falls below the guaranteed capacity (usually c.80%), Zenobē covers the cost of its replacement which could be lower or higher than the original battery cost.
Second life to minimise environmental impact and reduce first life cost: The initial Zenobe batteries are, once taken off the vehicles, refurbished and repurposed in new applications, usually as portable power sources (generator equivalents) on construction sites, film shoots, events etc. This extends their lives by a further c.5 years, at which point they will be recycled. This extended life increases the carbon savings created by each battery and the assumed residual value of the battery for this application can reduce first-life procurement costs.

11. What are your views on the Welsh Government’s assessment of the financial implications of the Bill as set out in Part 2 of the Explanatory Memorandum?

due to the following reasons:

- Electric drivetrains have far fewer moving parts compared to internal combustion engines (ICE), which reduces mechanical degradation,

resulting in less wear and tear over time. Electric motors operate more smoothly and efficiently than diesel engines, especially in urban environments where buses commonly operate, which reduces cumulative strain on the vehicle.

- Regenerative breaking is used in electric buses which reduces wear on brake pads and other mechanical components, whereas Diesel buses rely entirely on friction braking, increasing component wear.

Once you take into account these similar/slightly lower year on year costs and then also consider that the Useful Economic Life (UEL) for electric buses is assumed to be longer than 15 years (Diesel UEL) / up to 20 years. then considerable savings in the total asset lifetime are realised for an electric bus compared to a diesel bus.

12. Are there any other issues that you would like to raise about the Bill and the accompanying Explanatory Memorandum or any related matters?

To illustrate the total cost of ownership benefits discussed in our response, Zenobe has conducted an analysis comparing a 100-bus electric fleet and depot to a comparable diesel fleet over a 15-year period.
This analysis shows that operating the electric fleet is £9.6 million cheaper over the 15 years, equating to approximately £96,000 in savings per bus compared to diesel at diesel bus end-of-life.
However, a key factor in this cost advantage is that electric buses are assumed to deliver 250,000 more miles than diesel buses over their lifetime. This extended lifespan further reduces the per-mile cost of the electric asset.
When comparing lifetime to lifetime operating costs, it is 21% (18p) cheaper per mile to run an electric bus than a diesel bus.
Undeniably, electric buses have higher upfront costs — when including the vehicle and all required charging infrastructure and battery replacements these upfront costs are approximately 18p more expensive per mile than for diesel.
However, this is more than offset by the operational savings: energy and maintenance costs are 36p per mile cheaper for electric buses. It is worth noting that these calculations are based on current diesel and electricity prices. As diesel become less ubiquitous its costs are expected to rise, while the increasing adoption of renewable energy sources is likely to reduce electricity prices — further widening the gap in favour of electric buses. The time to make the transition is now.