



Consultation on the zero emission bus transition

Australian Hydrogen Council

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Introduction

The Australian Hydrogen Council (AHC) is the peak body for the hydrogen industry, with over 100 members from across the hydrogen value chain. Our members are at the forefront of Australia's hydrogen industry, developing the technology, skills and partnerships necessary to ensure that hydrogen plays a meaningful role in decarbonising Australian industry.

AHC welcomes the opportunity to engage with the design of Victoria's zero emission bus (ZEB) transition. We acknowledge this ambitious strategy and are grateful for the comprehensive view, technologically agnostic approach and detailed foundation. These will enable informed decisions from stakeholders engaging with this process.

While battery electric buses (BEBs) are the more mature technology and will likely dominate the urban bus industry, there is a key role for hydrogen fuel cell buses (HFCBs)¹ in the transition, particularly when considering the benefits of hydrogen for longer distances/coach routes, coupled with the diesel comparable infrastructure and refuelling speed. We appreciate the Victorian Government progressing the ZEB transition and the targeted approach beginning with BEBs, but we ask that this focus does not preference this technology and its associated depot infrastructure to the detriment to HFCBs. It is imperative that operators are provided with the best tools to make informed decisions about their specific business case and technologies.

In this submission we address three key themes: the necessity for regulatory harmony, enabling support mechanisms, and the important question of the origin and financing of the energy required.

AHC also supports the recommendations of the Bus Industry Confederation, as provided in its separate submission to this process.

The opportunity for regulatory harmony

The consultation paper outlines the scale and complexity of the ZEB transition within the larger framework of policy, regulation and standards, noting the impact and interruption this can and will have on bus operators and the service task.

Bearing this in mind, the AHC highly recommends the harmonisation of standards, specifications and interoperability between depots and Australian jurisdictions. We are reassured that that the Victorian Government is collaborating with other states and territories on this strategy and hope that standards and specifications can be consistent to avoid confusion, overcomplexity and the duplication of public workload.

Here there is a role for the Victorian Government to promote the clarity, education and suitability of standards as well as their impacts on Victorians. We understand that the Australian Government is reviewing the Australian Design Rules and urge the Victorian Government to advocate for the standards that will be necessary for the ZEB transition to thrive without regulatory roadblocks. For instance, the current rules dictate that two-axle buses are to have a maximum gross vehicle mass of

¹ Note that HFCBs is the language of the consultation paper and is used here interchangeable with fuel cell electric vehicle (FCEV) buses, as has been presented in other AHC documents.

18 tonnes;² however, this standard was not designed with the additional weight of fuel cells and batteries in mind. This means that these ZEBs would not be sanctioned to operate at the same capacity as a diesel alternative, which impacts efficiency. We also note that the EU has previously implemented mass allowances up to 2.5 tonnes to facilitate equivalent passengers for new technology buses,³ and has recently announced that further concessions are being reviewed to enable uptake.⁴ Furthermore, given the additional load this increase in vehicle weight will place on local roads, bridges and infrastructure, the Victorian Government will need to review and invest in preparation for this transition.

Given the scale of this transition, there is an opportunity for jurisdictions to harmonise and collaboratively design the new standards from inception, avoiding inconsistencies between states. For example, hydrogen and electric vehicles will have alternative safety protocols for emergency services, such as images or information on vehicle plates to guide responses for vehicle incidents. To avoid confusion on state-specific imagery across borders, it is imperative that there is consistency of rear marking plates when it comes to zero emissions technology identification of commercial vehicles.

Additionally, while local content requirements (such as local bus building plants) are important to support the bus industry, state-based content requirements create lower overall efficiency for the bus industry where there is a need for separate plants per state. Ideally, local content provisions should be extended to be nationwide to allow for efficiencies in production, especially as ZEBs are further established in Australia.

Furthermore, while collaborating with other jurisdictions, there is an opportunity to decrease the regulatory and financial burden of existing standards. A key example for bus operators is driver accreditation, where those that operate interstate must duplicate qualifications as well as the associated fees and procedures. These parties should not be penalised for increasing the transport network and accessibility of public transport.

The opportunity for harmony extends into the discussion regarding training. AHC supports the pilot course that the Victorian Government is coordinating with the Bendigo Kangan Institute and Australian Manufacturing Workers Union. In this early stage, we would like to see updates on the progress of this course and the facilitation of curriculum sharing. If Victoria is to mandate ZEBs from 2025, the upskilling accreditation infrastructure needs to be robust and implemented as soon as possible to facilitate qualified workers to safely operate and prepare prior to transitioning. To best facilitate this, the Victorian Government could undertake a gap analysis of existing and future competencies to understand any emerging skill gaps and use this to inform the development of training products. Such products would help to bridge knowledge gaps for existing workers, as well as providing training products for new workers joining the industry.

² National Heavy Vehicle Regulator (2019) *Variations of Buses under the Heavy Vehicle National Law & Gazette Notices*, December, <https://www.nhvr.gov.au/files/201801-0753-bus-chart-a3.pdf>.

³ Bus Industry Confederation (2022) *Bus and Coach Industry Submission on the National Electric Vehicle Strategy Consultation Paper*, November, <https://bic.asn.au/wp-content/uploads/doc/BIC0158.pdf>, p. 11.

⁴ ACEA (2023) *Swift action on Weights and Dimensions Directive to boost market uptake of zero-emission trucks and buses*, 4 July, <https://www.acea.auto/news/swift-action-on-weights-and-dimensions-directive-to-boost-market-uptake-of-zero-emission-trucks-and-buses/>.

When considering the workforce transition for zero emissions vehicles, we suggest:

- That there is consistency between learning institutions across Australia in terms of curriculum and certification.
- That there is a tiered approach to the curriculum to ensure that all students have the same base and can proceed with specific expertise where needed.
- Emergency services training should align with depot upgrades to ensure each region is prepared for the alternative procedures as the technologies are introduced at scale.

Support mechanisms and progressing total cost of ownership data

Public transport has an important role in the decarbonisation of Australia's road transport. However, this role in reducing transport emissions is only realised if the network is utilised consistently – that is, the bus is full. The Grattan Institute noted that the pandemic had decreased the appetite for commuting via public transport, although prior usage was already at a low 14 per cent. The report further points to price changes and the cost of running passenger vehicles (especially electric vehicles) as detractors to public transport use.⁵ Zero emission vehicles, both private and public use, should be understood as playing their part in the transition, and should complement rather than compete. Public transport should therefore strive to create competitive pricing models to incentivise higher usage, as well as enabling other public benefits, such as relieving congestion. While Victoria looks towards a ZEB fleet, it is also important that those dependent on this public service are shielded from the cost of the transition, with public transport fares kept as low as possible both to encourage use and support more vulnerable communities.

While buses currently make up less than one per cent of Australian transport, the fleet is responsible for up to six per cent of transport emissions.⁶ However, the potential of reducing the number of additional passenger cars on the road through behavioural change will have a compounding decarbonising effect. To realise this, the Victorian Government must implement mechanisms that will incentivise public use and support the effectiveness of bus operators by alleviating their concerns and assisting the financial responsibility of the transition through research, investment and common user infrastructure.

Unfortunately, there is a significant barrier to zero emission vehicle uptake in the form of a high purchase price and uncertain lifetime costs. Members have noted that the total cost of ownership (TCO) of zero emission vehicles can be up to three times the diesel equivalent. Especially when considering buses which are a commercial asset that requires a strong business case for the lifecycle of the vehicle, it is integral that policy interventions are implemented to encourage investment and derisk this transition. With this in mind, AHC welcomes the proposed ZEB transition and depot investment program at the operator level to ensure that the financial burden of the transition is shared and that upgrades are strategic. We look forward to future announcements on this.

⁵ Terrill, M., Burford, I. & Fox, L. (2021) *The Grattan car plan*, Grattan Institute, report no. 2021-14, October, <https://grattan.edu.au/wp-content/uploads/2021/10/Grattan-Car-Plan.pdf>.

⁶ Denniss, R., Quicke, A. & Parrott, S. (2023) *Stuck in the slow lane: Electrification of buses in Australia*, The Australia Institute, report, February, <https://australiainstitute.org.au/wp-content/uploads/2023/04/P1321-Slow-lane-electric-buses-Web.pdf>.

The Victorian Government can also enable the transition via tax breaks, instant asset write-offs, as well as initiatives such as electricity network concessions. In NSW, the network concession scheme provides up to 90 per cent concession on network use of system charges for electrolyser operations for 12 years, freeing up capital for upgrades and operations, while also being designed with parameters that positively influence the wider network.⁷

To assist in accelerating the large-scale transition, the Grattan Institute⁸ has recommended a purchase price incentive to bridge the cost gap for businesses while the heavy zero emission vehicle technologies mature. This report included a mechanism referencing the California Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP), in which governments offer vouchers to businesses at the point of purchase for 50 per cent of the gap, which would shrink as zero emission vehicles reach price parity with diesel. This is a possible mechanism that the Victorian Government could consider.

In terms of other enablers to the transition and facilitating bus operator confidence, AHC acknowledges the \$20 million Victorian ZEB trial which has strongly informed this strategy. We request that the lessons learned, especially for HFCBs, be published to not only assist other jurisdictions in their strategies, but also in TCO calculations for bus/coach operators and the wider transport network, as many of the challenges and complexities of transition will be shared. Alongside this, an additional element of TCO analysis is the access to common user infrastructure. There is a necessity for governments, both at state and federal levels, to understand, support (and in some cases coordinate) a public hydrogen refuelling network with nationally standardised consideration of access, suitability and consistency of hydrogen form (referring to liquid or compressed gas at specific pressure). Without a nationally consistent infrastructure strategy, the TCO of fuel cell electric vehicles and the commercial appetite for adoption will be severely impacted.

When it comes to depot master planning, transitioning from the traditional fuel bowsers at the larger depots to hydrogen will require significant planning regarding which configuration will suit the operation. CSIRO and GHD have recently released a report outlining the five predominant options, their challenges, benefits and a cost analysis.⁹ Further research could be developed here to contextualise the cost analysis coupled with the refueller installation and necessary upgrades. The paper also points to Europe, Japan and the USA for cases where governments have partnered with businesses to develop hydrogen infrastructure for mutual benefit and risk sharing. Provided that hydrogen refuelling at scale may require centralised offsite production,¹⁰ the Victorian Government has an opportunity to support this to ensure that distribution lines up with depot upgrades so that bus operators (especially smaller) interested in utilising hydrogen won't have such a strong

⁷ Office of Energy and Climate Change (2023) NSW Hydrogen Strategy: Application process for green hydrogen electricity concessions, NSW Government, March, https://www.energy.nsw.gov.au/sites/default/files/2023-03/NSW_Application_process_green_hydrogen_electricity_concessions_2023.pdf.

⁸ Terrill, M., Burford, I. & Fox, L. (2022), The Grattan truck plan: Practical policies for cleaner freight, Grattan Institute, report no. 2022-11, August, <https://grattan.edu.au/wp-content/uploads/2022/08/Grattan-Truck-Plan-Report.pdf>.

⁹ CSIRO & GHD (2023) *Hydrogen vehicle refuelling infrastructure: priorities and opportunities for Australia*, report, July, https://www.csiro.au/-/media/Missions/Hydrogen/Hydrogen_Vehicle_Refuelling_Infrastructure_Report.pdf.

¹⁰ Ibid.

dependence on developing onsite production or be constricted to using BEBs primarily due to logistical advantages.

We ask that Victoria's master planning be strategic and coordinated. Bus depots already have a crisis of available space, which is compounded in urban or developing areas where available real estate is sometimes at odds with a growing population. Therefore, we recommend that growth and scale is built into robust modelling, and that the government works with bus operators to adjust bus routes as necessary to take advantage of the specific ZEB technology while meeting passenger needs.

Common user infrastructure must also be considered. We note Lion Energy's Port of Brisbane project,¹¹ where bus operators will have access to common refuelling infrastructure, negating the lack of available depot space and the capital investment required for hydrogen refuelling in the back to base model. Especially in hubs where bus operators are likely to require hydrogen, the Victorian Government should facilitate, support and fund this financial efficiency from a wider city planning perspective that supports the ZEB transition.

Furthermore, this transition should focus on collaboration rather than competition. At this stage, Australia has five operational hydrogen refuelling stations, with up to another 20 in the pipeline.¹² While this network may be ambitious for the current demand, it will be insufficient for easing range anxiety in commercial operations that depend on heavy vehicles, especially as not all refuellers will be appropriate for buses and trucks. Despite the relatively long range of fuel cell electric vehicles, there is significant distance between refuelling stations. If any of these stations is inaccessible or under maintenance, it risks compromising the security of the network.

With this in mind, we ask that the Victorian Government considers whether hydrogen refuelling infrastructure at depots could also be utilised by other corporate, heavy vehicles to expand the refuelling network available, particularly in the early stages of the transition. These corporate customers/partnerships could also assist in accelerating the return on investment of the infrastructure.

The responsibility of electricity upgrades

The AHC is pleased that the Victorian Government is ambitiously progressing decarbonisation plans. However, there are concerns that the transition relies on an electricity grid that is undergoing significant evolution and crisis, requiring fundamental transformation and investment. At this current stage, we have electrons competing for uses, which is a monumental shift that requires collaboration and planning.

We are hearing about how, in some jurisdictions, an absence of policy connection and thinking at the procurement stages, or in the process to scale up past the trial stage, appears to leave bus

¹¹ Lion Energy (2023) 'Lion Announces Its First Green Hydrogen Hub Location at Port of Brisbane', media release, 28 August, <https://lionenergy.com.au/lion-announces-its-first-green-hydrogen-hub-location-at-port-of-brisbane/>.

¹² CSIRO & GHD (2023) *Hydrogen vehicle refuelling infrastructure: priorities and opportunities for Australia*, report, July, https://www.csiro.au/-/media/Missions/Hydrogen/Hydrogen_Vehicle_Refuelling_Infrastructure_Report.pdf.

companies to build and pay for electricity transmission upgrades. This is a situation for which they have neither planned, nor have expertise in. We note an example provided to us, where the procurement process misaligning with transmission upgrades timelines, led to ZEBs being stranded at a depot for two years with no energy. In this, it is necessary for transport and energy decision makers to be collaborating and troubleshooting the transition on an already overburdened grid.

According to data presented in the consultation paper, only the largest 20 Victorian bus operators will be required to consider and implement grid upgrades. More information is required on how this process will be coordinated and facilitated through the Victorian Government to ensure that bus operators are supported and provided with the best advice. Where possible, the Victorian Government should own grid upgrades.

There is also an opportunity present for HFCBs in the weighing of costs. Current CSIRO and GHD research notes that while operational refuellers include onsite production, for the scale required for Australia's transport decarbonisation, hydrogen will generally be produced at a centralised offsite location and transported to refuelling stations via truck,¹³ therefore, lessening the need for transmission upgrades at the depot level. This will still come down to the individual business case, however, it is a notable prospect if significant grid investment is required by bus operators.

Summary

Once again, we welcome the Victorian Government's ambitious ZEB transition plan, as well as the opportunity to participate in its design.

We highlight the opportunity for regulatory harmony between the Victorian Government, the Australian Government, and other jurisdictions, in designing and streamlining the landscape for bus operators interacting with BEBs and HFCBs. This transition is a chance to address outdated standards, as well as facilitating clarity, consistency, and ease of use in incoming standards.

As the Victorian Government builds this strategy, it has a responsibility to push the transition to its full potential, further incentivising investment and sharing risk. This refers to direct financial support in the purchase of ZEBs, such as in the form of tax breaks, instant asset write-offs or the HVIP-type model. There are also supplementary supports that alleviate or clarify costs, such as network concessions, similar to the NSW model, and further research and trials to inform TCO calculations.

Perhaps the most integral support for HFCBs is in addressing refuelling infrastructure. Developing common user infrastructure, coordinating with other jurisdictions on standards, and incentivising centralised hydrogen production for HFCBs.

Finally, the cost of necessary electricity upgrades integral to not only the ZEB transition but the decarbonisation of all Australia and the second industrial revolution, should not be left solely in the hands of bus operators who are not naturally equipped. The Victorian Government must strongly facilitate or own these grid upgrades.

We look forward to engaging further in this matter.

¹³ Ibid.

If you wish to discuss any element of this submission in further detail, please contact me at ncerexhe@h2council.com.au.

Kind Regards,

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