Submission to the National Hydrogen Strategy Review

August 2023

Introduction

The Australian Logistics Council (**ALC**) welcomes the opportunity to make a submission on the National Hydrogen Strategy Review Discussion Paper (**the Discussion Paper**).

ALC is the peak national body representing major companies participating in the end-to end freight supply chain and logistics industry with a focus on delivering enhanced supply chain safety, efficiency and sustainability.

Freight affects every Australian, every day, everywhere. Common goods purchased by Australians such as food, clothing, household appliances and medicine all need to be transported by freight operators. Australia's population is expected to grow by 10 million by 2040, an increase which must be supported through proactive investment in infrastructure.

ALC agrees with the observation contained in the Australian National Hydrogen Strategy document that:

> *Using locally made hydrogen can help reduce Australia's heavy dependence on importing liquid fuels, especially for transport. This would potentially strengthen Australia's strategic security and maximise our energy resilience.* [1]

However, as Australia makes this transition to a decarbonised economy, decision makers must not forget the need to ensure a resilient and efficient end to end supply chain to carry the Australian freight task.

This means that care needs to be taken to ensure that decisions made to incentivise the adoption of methods of transport utilising alternative fuels does not distort the efficient operation of the marketplace.

In this submission, ALC will be principally concentrating on questions regarding the mandating of targets listed on page 21 of the Discussion Paper.

Understanding Freight Transport and Supply Chains

The Australian economy has become increasingly reliant on sophisticated, continent spanning and international supply chain networks. The freight industry serves as the backbone of the economy,

[1] https://www.dcceew.gov.au/sites/default/files/documents/australias-national-hydrogen-strategy.pdf: 17

facilitating the movement of raw materials, finished products, and essential supplies both within Australia and across the globe.

The supply chain is made up of a highly complex network of interconnected and interdependent parts, with each component playing an essential role in ensuring the smooth and efficient flow of goods and services from a myriad of suppliers to a myriad of end consumers. This comprehensive system involves various entities, including suppliers, manufacturers, warehouses, distributors, retailers, and consumers. Their connections are interwoven through a series of complex set of interdependencies that must work in harmony for supply chains to function effectively.

The productivity and efficiency of a supply chain hinges on the discrete performance and cohesive integration of its various sub-systems. This includes not only freight transport and logistics but also encompasses urban planning and planning regulations, communications, information technology, legal and regulatory systems, and the people and infrastructure that support the process.

Freight transport refers to the movement of goods/commodities/freight or cargo from one location to another and involves the use of various modes of transportation, including trucks, trains, ships, airplanes, and, in some cases, pipelines. Efficient freight transport systems are essential for reducing congestion, travel time, and emissions while enhancing overall connectivity. The performance of transportation networks is highly dependent on the infrastructure available, and in the transition towards renewable energy, this plays a significant role.

Road transport

The Australian transportation sector is a major contributor to greenhouse gas emissions (19% of Australia's total emissions in 2022[2], 85% of which is road transport[3]), with heavy vehicles playing a significant role despite their smaller numbers on the roads relative to the number of cars and other vehicles. Articulated trucks travel only make up 1% of the vehicle population, but they contribute a 15% of transport emissions due to their fuel inefficiency.[4] Moreover, these trucks cover extensive distances, covering 600 percent more kilometres per year than the average passenger vehicle. This means that transitioning even a single delivery truck to zero-emission technology could have the same impact as converting nearly six passenger cars.

However, there are several obstacles to achieving this transition. One of the key factors is that the pace of transition to cleaner heavy transport in Australia lags behind that of lighter vehicles. Trucks in Australia have a notably longer lifespan, typically between 10-15 years, compared to their

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[2] ttps://www.dcceew.gov.au/energy/transport#:~:text=In%202022%20our%20transport%20sector,source%20of%20emissions%20by%202030.

[3] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.climatechangeauthority.gov.au/sites/default/files/2021Fact%20sheet%20-%20Transport.pdf

[4] Adiona Tech (2023). https://uploads-ssl.webflow.com/5f276424cd1d3033a76da418/6451ea7d71fb400e5951cb05_Connected%20Thinking%20-%20An%20Adiona%20Tech%20report%20on%20Australian%20transport%20electrification%20priorities.pdf This report is based on the most recent data from the Australian Bureau of Statistics - ABS (2020), Survey of Motor Vehicle Use, Australia, https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release).

counterparts in other countries[5]. As highlighted by The Grattan Institute, roughly 14% of Australian trucks on the roads were manufactured before 1996 — a time when no pollution standards were in place in the country[6]. Additionally, another 12% of trucks (built between 1996-2002) only needed to comply with the Euro I emissions standard. As a result, the landscape of Australia's heavy transport is skewed towards older, high-emission vehicles that fail to meet not just current standards and cannot being to meet aspirational environmental targets. To address this, Australia needs a comprehensive set of support strategies to reduce the average age and, subsequently, the emissions of its heavy vehicle fleet.

However, as these aging vehicles reach the end of their lifespan and Australia aims to reduce carbon emissions, there is an unfortunate shortfall in the supply of Zero- and Low-Emission Vehicle (ZLEV) technology for heavy vehicles. According to the Truck Industry Council, the technology for trucks is estimated to be about five years behind that of passenger vehicles. Currently, there isn't a commercially viable ZLEV technology available for freight transport that could effectively replace Internal Combustion Engines (ICE)[7].

As the Truck Industry Council said in 2022:

> *ZE [zero emission] truck technology lags passenger car development by approximately 5 years. While this gap is likely to close between now and 2030, there remain significant barriers for the uptake of ZE trucks. Currently ZE truck technology is limited to city/metro, volume constrained freight, distribution applications. There is no viable ZE truck technology that is commercially available for intra and interstate (long and line-haul) freight, multi-combination (B-Double, Road Train, etc) freight, remote area freight and mass constrained (building/construction materials, waste, refrigeration, etc) freight. Therefore, the majority of road freight in Australia, in 2022, does not currently have a ZE solution. Of course, this will change in time, as ZE truck technology evolves.*

The industry is currently in an exploratory phase, testing which type of Zero Emission Vehicle (ZEV) will be the most effective for freight tasks. Options being pursued include electrical vehicles.

Additionally it has been reported that the emergence of rapid battery swapping services, combined with conversion of heavy trucks from diesel to electric power may have eliminated any potential benefit to hydrogen in the long-distance freight sector. This is a possible option being explored by some industry participants.

Other companies are developing hydrogen combustion engines (that can use diesel where there is an absence of hydrogen refuelling infrastructure), which may in the long term be a possible option for heavy vehicle operators.

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[5] Electric Vehicle Council and Australian Trucking Association (2021), Electric trucks: Keeping shelves stocked in a net zero world, https://electricvehiclecouncil.com.au/wp-content/uploads/2022/01/ATA-EVC-Electric-trucks_Keeping-shelves-stocked-in-a-net-zero-world-2.pdf.

[6] Terrill, M., Burfurd, I. and Fox, L. (2022), The Grattan truck plan: Practical policies for cleaner freight, Grattan Institute, report, August, https://grattan.edu.au/wp-content/uploads/2022/08/Grattan-Truck-Plan-Report.pdf.

[7] Truck Industry Council (2022), Truck Industry Council's submission to the Commonwealth of Australia's National Electric Vehicle Strategy Consultation Paper – September 2022, https://consult.dcceew.gov.au/national-electric-vehicle-strategy/submission/view/457.

And as indicated in the *Hydrogen for Transport Report* prepared for the COAG Energy Council in 2019:

> *Vehicle supply: Globally, there are only a few models of hydrogen fuel cell vehicles that are in production and available for purchase. This includes some seven models of passenger vehicles, and slightly more variants of buses and trucks. The availability of fuel cell vehicles in Australia is further restricted, by the availability of Right Hand Drive (RHD) variants. Most manufacturers are focusing their initial efforts on developing a Left Hand Drive (LHD) variant, simply due to the relative size of the market (including the USA, Canada and most of Europe). This has meant that while markets such as America have already sold several thousand FCEVs to consumers, the Australian market will not have hydrogen vehicles available for out-right purchase until 2020*[8]
>
> These dynamics have not changed over the intervening years. As reported as recently as 28 June 2023:
>
> *The availability of FCEV trucks in Australia from original equipment manufacturers (OEMs), preferred by road transport operators and financiers, is low or missing with most going to left-hand drive markets in Europe and North America, meaning no right-hand drive trucks are available in any quantity for Australia.*[9]

The Grattan Institute's truck plan proposes the establishment of binding zero emission sales targets, applied to the sellers of new heavy vehicles, with sales targets enforceable through the imposition of financial penalties. However, it is important to note that Grattan does not distinguish between Fuel cell electric vehicles (FCEVs) and battery electric vehicles: it treats both as being ZEVs.

Mandatory targets represent one strategic approach to incentivise behavioural changes within road transport operations. An illustrative example of this approach comes from the European Union's provisional renewable energy directive. On 30 March 2023 the European Union announced a provisional deal for a renewable energy directive the proposers imposing a minimum requirement of 1% of renewable fuels of nonbiological origin (mostly renewable hydrogen and hydrogen based synthetic fuels) in the share of renewable energy is supplied to the transport sector in 2030.[10]

A significant commitment to ZEVs is evidenced by the Australian Government's engagement in the Glasgow Breakthrough on Road Transport. This commitment aims to redefine the norm, envisioning ZEVs as accessible, affordable, and sustainable options by 2030.[11] However, one of the challenges of increasing the uptake of ZLEVs is the fact that there are few units available for purchase. Supply is extremely limited for Australia's left-hand drive market, for an uncertain period of time.

Moreover, heavy vehicles are primarily commercial assets and, unlike passenger vehicles, need a compelling business justification covering the entire lifespan of the vehicle, acknowledging associated

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[8] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.dcceew.gov.au/sites/default/files/documents/nhs-hydrogen-for-transport-report-2019.pdf

[9] https://autotalk.com.au/industry-news/hydrogen-trucks-planned-for-australia

[10] https://www.consilium.europa.eu/en/press/press-releases/2023/03/30/council-and-parliament-reach-provisional-deal-on-renewable-energy-directive/

[11] https://racetozero.unfccc.int/system/glasgow-breakthroughs/#:~:text=decade%20of%20delivery.-,With%20the%20Glasgow%20Breakthroughs%2C%20governments%20are%20committing%20to%20put%20in,with%20the%20Global%20Checkpoint%20Process.

risks. Approximately 80% of truck businesses operate with five or fewer vehicles. Hence, even the transition of a single truck becomes a significant factor affecting the business's operational capacity. In such scenarios, uncertainties related to the total cost of ownership and inadequate infrastructure become even more crucial, necessitating strong incentives and support mechanisms to encourage a shift towards cleaner technology. The Australian Government plays a critical role in facilitating this transition by instilling confidence and reducing financial burdens through measures like subsidies, tax breaks, and the elimination of import duties for heavy ZLEVs.

The heavy vehicle industry needs clear market signals to ensure confident and secure investment. While regulatory barriers and infrastructure are fundamental concerns, as these issues are addressed, bold policy measures will be needed to reduce costs and stimulate the supply of heavy ZLEVs.

Infrastructure

There is limited refuelling infrastructure in Australia. The Grattan Institute observed in its Grattan Truck Plan that publicly accessible hydrogen refuelling stations (as well as charging stations) "are few and far between".[12] The State of Hydrogen 2022 report indicates that Australia has only a handful of operational refuelling stations, most of which are not at a commercial scale[13]. Given the considerable distance between the stations, the reliability of travel could be jeopardised if even one station is inaccessible or undergoing maintenance, despite the relatively long range of Fuel Cell Electric Vehicles (FCEVs).

The National Hydrogen Industry Association (NHIA) modelling suggests that initial domestic demand across all jurisdictions is primarily driven by the transport sector. However, according to the State of Hydrogen 2022 report, light and heavy transport are among the four hydrogen sectors making the slowest progress. Both reports highlight the critical role of refuelling infrastructure in supporting this demand, emphasising the need to locate such facilities in major cities and along key freight routes.

As recently as 1 August 2023, it was announced that Australia's **first** hydrogen refuelling station for heavy vehicles was opened at Port Kembla, which took advantage of being located alongside an existing hydrogen production plant and transport hub.[14]

The NSW, Victoria and Queensland Governments have signed a Memorandum of Understanding for an East Coast hydrogen refuelling network. As part of that, NSW and Victoria are funding the delivery of "at least 4" hydrogen refuelling stations along the Hume Highway.[15]

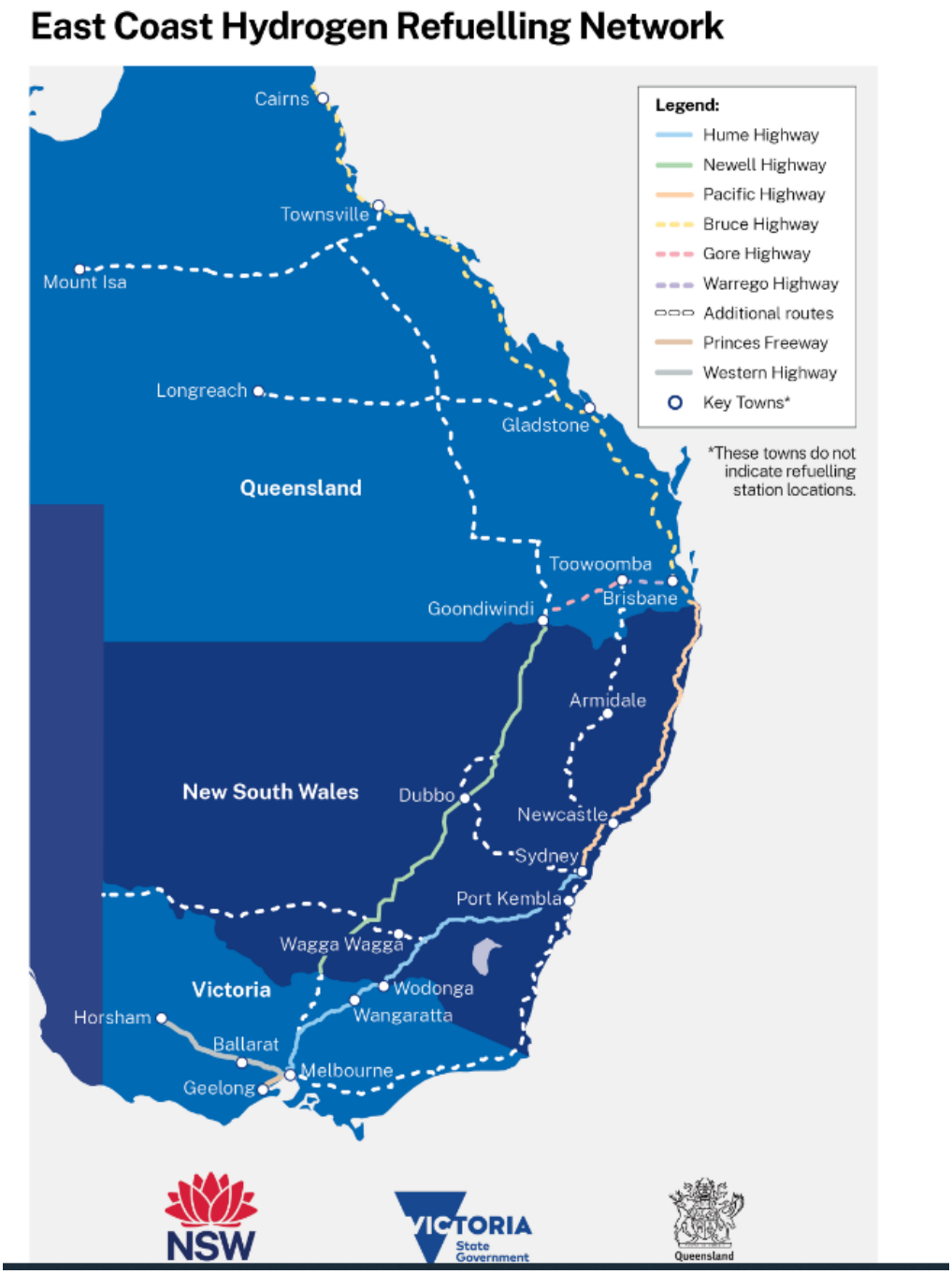
[12] https://grattan.edu.au/wp-content/uploads/2022/08/Grattan-Truck-Plan-Report.pdf: 34

[13] Australian Government (2023b) A new national Net Zero Economy Agency, media release, Department of the Prime Minister and Cabinet, 5 May, https://www.pmc.gov.au/news/new-national-net-zero-authority

[14] https://bigrigs.com.au/2023/08/01/first-hydrogen-refuelling-station-for-heavy-vehicles-opens/

[15] https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/hydrogen-refuelling-network-funding

The East Coast Hydrogen Refuelling Network promised by the three State Governments:



A shortage of available FCEVs and an absence of refuelling infrastructure means that it would be inappropriate to impose a mandated target for the uptake of hydrogen powered heavy vehicles to undertake the freight task.

As discussed, the industry is still testing the best ZEV technology that can deliver a return on investment for the company whilst advancing the Government's zero emissions agenda. This requires

significant capital expenditure by all forms of industry participant. There must be clarity of direction from the Government so as to encourage companies to make the necessary investments.

To provide industry with the confidence to invest in both heavy vehicles and fuelling infrastructure Australia's Governments should develop a comprehensive ZEV policy for heavy vehicles, setting out how they will incentivise the uptake of vehicles whilst identifying how supporting infrastructure will be provided. An agreed national response is urgently required.

Rail

When it comes to rail transport, the situation is quite similar.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is currently undertaking a feasibility study to explore the potential of introducing hydrogen-powered trains for bulk freight, specifically within the mining sector.[16]

In parallel, rail freight operator Aurizon is also conducting research on how to reduce its carbon footprint in its heavy haulage road network. Among various strategies, the company is considering a combination of battery and hydrogen fuel cell technologies as potential substitutes for diesel power[17].

However, it's important to note that these initiatives are still in their early stages.

Before any substantial investment can be justified, a comprehensive economic feasibility study on the use of hydrogen in rail transport should be conducted. This point is underscored by the experience of a state-owned public transport company in Germany, which launched the world's first hydrogen-only railway line last year. Despite investing over €93m in 14 hydrogen fuel-cell trains that began operations in August 2022, a subsequent study by the German state found that the operational costs of hydrogen trains were 80% higher compared to conventional alternatives[18].

However, the importance of a concerted effort to enable and support a freight transport modal shift from road to rail – wherever possible - is a first step in emissions reduction simply by reducing the numbers of trucks required to transport the same volume of freight.

[16] https://research.csiro.au/hyresource/hydrogen-powered-trains-feasibility-study/

[17] https://www.electricandhybridrail.com/content/news/batteries-and-hydrogen-could-power-heavy-rail-in-australia-in-the-next-decade-study-reveals/

[18] https://www.hydrogeninsight.com/transport/will-no-longer-be-considered-hydrogen-trains-up-to-80-more-expensive-than-electric-options-german-state-finds/2-1-1338438

Maritime

The shipping industry worldwide is a notable contributor to CO2 emissions, responsible for approximately 3% to 4% of the total emissions[19]; equivalent to the Japanese or German economies.

ALC notes that in June 2023 the International Maritime Organization (IMO) set revised targets in the 80th session of the Marine Environmental Protection Committee (MEPC) to decarbonize the global fleet include a 20% reduction in greenhouse gas (GHG) emissions by 2030, a 70% reduction by 2040 (compared to 2008 levels), and the ultimate goal of achieving net-zero emissions by 2050.[20]

The concept of hydrogen-powered vessels themselves is still in its nascent stage, with several uncertainties and unknown factors surrounding it. There are already experimental vessels of a smaller scale being tested across the globe, particularly in countries like the UK and Canada[21]. While the ongoing trials of hydrogen-fuelled experimental vessels worldwide provide valuable insights, safety, economic viability, port infrastructure, and vessel design remain key areas requiring in-depth research and resolution before any significant investments can be made.

Ammonia and methanol are increasingly being viewed as viable potential substitutes for the bunker fuel currently used in shipping. According to researchers from the Grattan Institute, if Australia were to produce 6.5% of the world's ammonia using green hydrogen by 2050, it could lead to the creation of an additional 5,000 permanent jobs. If the global shipping industry were to switch exclusively to ammonia, and Australia maintained its 6.5% market share, this figure could rise by another 15,000 jobs[22].

A noteworthy recent development is Maersk, introducing its inaugural green methanol-powered ship. In fact, the global orderbook for these eco-friendly vessels has now crossed the 100 mark[23]. Hydrogen assumes a dual role as both a fuel and a feedstock for methanol production. Clean hydrogen emerges as a promising avenue to decarbonize the high-temperature processes in this sector.

The shift to clean fuels for shipping presents opportunities as well as challenges. Whilst as a whole the industry uses a significant volume of fuel, no one company or port will have sufficient enough offtake to enable the construction of at-scale future fuel production. Therefore, shipping companies are increasingly looking to manage risk by investing upstream to secure supply of fuels. For example, ALC member Port of Melbourne (PoM) is collaborating with Maersk and other supply chain participants to understand the commercial feasibility of establishing a green methanol bunkering hub at PoM, as part of local efforts to understand markets, transportation tasks and any challenges that may need to be addressed.

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[19] https://europe.oceana.org/shipping-pollution-1/#:~:text=Shipping%20is%20responsible%20for%20over,dioxide%20emissions%20and%20is%20growing.

[20] https://www.irclass.org/media/6665/mepc-80th-session-meeting-report-summary.pdf

[21] https://blueeconomycrc.com.au/project/hydrogen-powering-of-vessels/

[22] Wood, T., Dundas, G., and J. Ha (2020) *Start with steel*, Grattan Institute, Report No. 2021-07, July https://grattan.edu.au/wp-content/uploads/2021/04/Towards-net-zero-Practical-policies-to-reduce-transport-emissions-Grattan-Report.pdf

[23] https://www.maersk.com/news/articles/2023/06/26/maersk-orders-six-methanol-powered-vessels

Conclusion

ALC supports initiatives such as the Hydrogen Headstart program[24] and the various jurisdictional Hydrogen Industrial Hubs programs[25] so that Australian hydrogen is available for use in various applications including transport applications.

Moreover, the transport and logistics sector is playing its part in ensuring that Australia becomes a net zero economy by 2050.

However, it needs to be recognised that in the absence of the following, it is somewhat premature to mandate targets to encourage the uptake of hydrogen powered transport units:

- a local manufacturing capacity to produce either the hydrogen fuel for use in the sector, or transport vehicles;
- refuelling infrastructure within and between cities;
- fully completed research as to the effectiveness of hydrogen as a fuel in the transport and logistics area; or
- in the case of road freight, an inability to source FCEVs in sufficient quantities from overseas.

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[24] https://arena.gov.au/assets/2023/05/hydrogen-headstart-consultation-paper.pdf

[25] Such as those programs offered by the Commonwealth https://www.dcceew.gov.au/about/news/funding-available-for-clean-hydrogen-industrial-hubshttps://www.dcceew.gov.au/about/news/funding-available-for-clean-hydrogen-industrial-hubs) and NSW https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/hydrogen-hubs-nsw