CONSULTATION – TRANSPORT AND INFRASTRUCTURE NET ZERO ROADMAP

AUSTRALIAN TRUCKING ASSOCIATION SUBMISSION
1 AUGUST 2024

1. About the Australian Trucking Association

The Australian Trucking Association (ATA) is a united voice for our members on trucking issues of national importance. Through our ten member associations, we represent the 60,000 businesses and 200,000 people who make up the Australian trucking industry.

2. Introduction

The Australian Government has issued their Transport and Infrastructure Net Zero Consultation Roadmap. The paper seeks input on potential pathways for achieving economy-wide net zero emissions in the transport and transport infrastructure sectors. The Government is seeking industry input on the necessary actions and policies that must be implemented to support these pathways.

Responses to the questions posed throughout this Consultation Roadmap will inform the development of the final Transport and Infrastructure Net Zero Roadmap and Action Plan, which will be released later this year.

3. Summary of recommendations

The recommendations throughout this submission can be summarised as follows.

1. The Government should cap carbon emissions from heavy vehicles at their current levels and work closely with industry to establish emission reduction targets.

2. The Government should consider hydrogen-based technology as a potential pathway to reducing carbon emissions in the heavy vehicle industry.

3. The Government should create an environment that facilitates maximum innovation in alternative fuels to secure the development of stable and mature carbon emission reduction technologies.

4. The Government should amend ADR 43/04 to allow refrigerated trucks to be 2.6 metres wide.

5. The Government should Amend ADR 43/04 to extend the safer freight vehicles concept to trailers.

6. The Government should amend the Australian Design Rules to deliver an 8-tonne single steer axle mass limit and a 1.5 tonne increase in the tandem drive rear axle mass limit for low or zero carbon trucks.

7. The Government should invest an additional $5 billion in truck roads and rest areas over the ten-year infrastructure pipeline.

8. The Government should permanently reinstate full expensing for trucks and trailers.

9. The Government should incentivise the purchase of low or zero carbon trucks.

10. The Government should increase its focus on rapid and ultra-fast charging infrastructure for trucks.

11. The Government should promote safer and more productive heavy vehicles.

12. The Government should assess and understand the upgrade capacity of key freight roads and structures.

4. Industry overview

The key facts and figures for the heavy vehicle industry are as follows:

a. Current industry

If current policy and technology trends continue, global energy consumption and energy-related carbon dioxide emissions will increase through 2050 due to population and economic growth.[1] This is pertinent as hard-to-electrify transportation sectors such as long-haul trucking have very limited mature low-carbon technology options.[2] Even with aggressive reductions in travel growth, shifts to mass modes of transport, efficiency improvements and deep market penetration by vehicles running on electricity and hydrogen, there remains a large demand for dense liquid fuels up to 2075.[3] Currently, 94% of Australia's total energy consumption is derived from fossil-based sources. This makes Australia the highest emitter of greenhouse gases per capita of any nation globally.[4]

b. Challenges

Heavy vehicles are major contributors to greenhouse gas emissions and air pollution.[5] Forecasts suggest that without a policy to cause the diesel fleet to retire early, diesel will remain at around 55 per cent of the total heavy vehicle fleet in 2050, locking in emissions from diesel combustion well past 2050.[6]

The heavy vehicle fleet is a hard to abate sector and a complete transition to zero carbon vehicles is currently not feasible. This is due to several technological, economic, and infrastructural challenges. The industry faces significant hurdles in transitioning to zero-

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[1] US Energy Information Administration, *International Energy Outlook 2021* (IEO2021), Centre for Strategic and International Studies (October 2021).
[2] Lewis Fulton *et al*, 'The need for biofuels as part of a low carbon energy future' (2015) 9(5) *Biofuels, Bioproducts and Biorefining* 476.
[3] Ibid.
[4] Hong Li *et al*, 'A review on renewable energy transition in Australia: An updated depiction' (2020) 242(1) *Journal of Cleaner Production* 6.
[5] Luisa Franchina, 'Thinking green: The role of smart technologies in transforming cities' waste and supply Chain's flow' (2021) 2 *Cleaner Engineering and Technology* 1.
[6] Department of Primary Industries and Regional Development, *Renewable Diesel Factsheet* (2023) <https://www.agric.wa.gov.au/sites/gateway/files/Renewable Diesel Factsheet.pdf>.

emission technologies, which are not yet sufficiently advanced or widely available to meet the demanding requirements of heavy freight operations. Furthermore, the Government cannot accurately predict the exact timelines and duty cycles of competing low emissions technologies. “Decarbonisation can be a difficult concept for operators to get their minds across, but it’s important that they do because the low and no carbon future is already upon us. We have targets from governments, but we have little assistance and no definitive direction that can be implemented based upon current expectations around cost reductions”.[7]

In the interim, we propose a pragmatic target that aligns with the Government’s environmental objectives and industry’s capability. This approach acknowledges the growing freight task and aims to mitigate potential negative environmental impacts.

By adopting a balanced approach that caps emissions at current levels and working with industry to set realistic targets, supported by the comprehensive recommendations throughout this submission, we can promote a stable reduction of carbon emissions in the heavy vehicle sector.

Recommendation: Cap carbon emissions from heavy vehicles at their current levels and work closely with industry to establish realistic and achievable carbon emission reduction targets.

Hydrogen has emerged as a potential solution to reducing carbon emissions in the long-haul freight sector due to faster refuelling speeds and longer ranges. The development of a hydrogen fuelling solution is still in its infancy, and the Government should focus on this in the medium-term as part of a holistic view to reducing emissions.[8] It should be noted that the productivity and infrastructure recommendations in this submission benefit hydrogen fuelled trucks also.

Recommendation: The Government should consider hydrogen-based technology as a potential pathway to reducing carbon emissions in the heavy vehicle industry.

The evolution pathways of alternative fuel heavy vehicle technologies are currently unclear. The ATA submits that the Government remains fuel agnostic and open to a mixture of alternative fuels and technologies including combustible and hydrogen fuel cell options that will reduce carbon emissions in the heavy vehicle sector.

Recommendation: The Government should create an environment that facilitates maximum innovation in alternative fuels to secure the development of stable and mature carbon emission reduction technologies.

Work undertaken by the International Council on Clean Transportation in their white paper ‘Total Cost of Ownership of Alternative Powertrain Technologies for Class 8 Long-Haul Trucks in the United States’[9] provides detailed insight into low and zero carbon technologies (battery electric, hydrogen fuel-cell and hydrogen ICE) against current diesel-powered trucks. Some of the key issues affecting operators are summarised below.

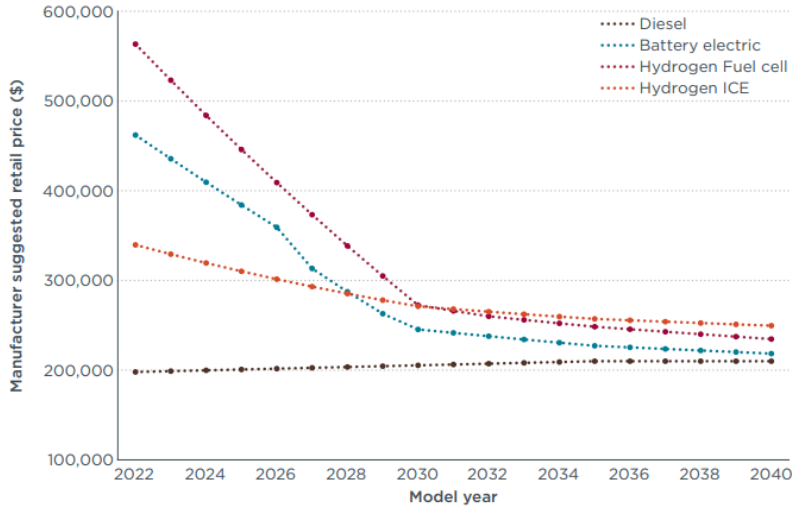
[7] Samson Kwok Yu Fu, ‘Metropolitan Freight Efficiency and Emissions Project Review and Closure Report’ (2024) Western Roads Federation & Curtin University, 10.
[8] Ibid.
[9] International Council on Clean Transportation, ‘Total Cost of Ownership of Alternative Powertrain Technologies for Class 8 Long-Haul Trucks in the United States’ <https://theicct.org/wp-content/uploads/2023/04/tco-alt-powertrain-long-haul-trucks-us-apr23.pdf>.

Upfront costs:

Diesel: Generally, diesel trucks have the lowest upfront cost compared to zero-emission vehicles. They are well-established in the market and benefit from economies of scale.

Battery electric: These have a significantly higher upfront cost, primarily due to the cost of the battery. In 2020, the upfront cost for a battery-electric truck was estimated between USD$200,000 and USD$800,000, depending on the range and battery size.

Hydrogen fuel cell: These typically have even higher upfront costs than battery electric trucks. The cost is driven by the hydrogen fuel cell technology and storage requirements, which are currently more expensive than battery technology due to their infancy.



Operating costs:

Diesel: Operating costs are primarily influenced by fuel prices, maintenance, and emissions-related expenses. Diesel fuel costs are generally higher compared to electricity but lower than hydrogen.

Battery electric: These have lower operating costs due to cheaper electricity prices and reduced maintenance needs, as they have fewer moving parts and no emissions-related equipment.

Hydrogen fuel cell: Operating costs are higher than battery electric trucks because hydrogen fuel is currently more expensive than electricity, and the technology requires specialised maintenance.

Payload capacity:

Diesel: Generally diesel trucks have a high payload capacity due to their established technology and efficiency in weight distribution.

Battery electric: The payload capacity can be limited by the weight of the battery. Larger batteries needed for extended range can reduce the payload capacity unless regulatory adjustments allow for higher vehicle weights.

Hydrogen fuel cell: These trucks can offer better payload capacity than battery electric trucks because hydrogen storage systems are lighter than equivalent battery systems, allowing for more cargo weight.

5. The Road to Net Zero – Modernising Australia's truck fleet

The ATA is working in collaboration with other key industry bodies to support the Government's Net Zero initiative. We are advising the Government on measures that are commensurate with their targets and that mature quickly, seeing measurable progress toward carbon reduction goals.

We have a four-pillar approach to modernising the Australian truck fleet, addressing and supporting the targets set by the Government.

- Drop in fuels
- Removing the barriers to the use of low or zero carbon vehicles
- Incentivising the purchase of low or zero carbon vehicles
- Higher productivity vehicles

There are also numerous routes to navigate in the medium to long term. Some of these policies and actions will take much longer to mature than the following advice but must form part of the ongoing conversation.

6. Drop in fuels

Australia imports most of its oil. In 2021, 91 per cent of all refined product consumed in Australia was imported. This includes imported refined oil and imported crude and condensate that is refined domestically.[10] Australia remains heavily reliant upon fossil fuels and has some of the highest reliance on fossil fuels for power generation in the world.[11] This dependence on imported fossil fuels makes the trucking industry vulnerable to supply disruptions and price volatility in global oil markets.

Encouraging the adoption of alternative fuels like renewable diesel reduces reliance on finite fossil fuel resources and enhances energy security and resilience. These fuels can be produced domestically from renewable sources[12], reducing dependence on imported oil and strengthening Australia's energy independence.

Alternative fuels like renewable diesel offer significant reductions in greenhouse gas emissions compared to conventional fossil fuels. Renewable diesel, produced from renewable feedstocks such as oilseed crops can reduce greenhouse gas emissions by 63%-77% compared to petroleum diesel.[13]

Alternative fuels offer environmental benefits beyond greenhouse gas emissions reduction. Renewable diesel and hydrogen produce fewer harmful air pollutants like carbon monoxide (CO) and nitrous oxide (N_2O)[14] and less particulate matter like sulphur oxides (SOx) compared to conventional diesel fuel. Renewable fuels have higher cetene

[10] Department of Industry, Science, Energy and Resources (June 2021) *Australian Petroleum Statistics – Issue 299*.
[11] Hong Li *et al*, 'A review on renewable energy transition in Australia: An updated depiction' (2020) 242(1) *Journal of Cleaner Production* 6.
[12] Department of Climate Change, Energy, the Environment and Water, *Enabling supply of renewable diesel in Australia: A consultation paper on establishing a paraffinic diesel fuel standard for Australia* (November 2023) 4.
[13] Hui Xu *et al*, 'Life Cycle Greenhouse Gas Emissions of Biodiesel and Renewable Diesel Production in the United States' (2022) 56(12) *Environmental Science and Technology* 7512.
[14] Kwangsam Na, 'Impact of biodiesel and renewable diesel on emissions of regulated pollutants and greenhouse gases on a 2000 heavy duty diesel truck' (2015) 107 *Atmospheric Environment* 307.

number paraffinic hydrocarbons.[15] These are free of aromatics and sulphur and produce less particulate emissions enabling longer regeneration frequency in the engine and, consequently, lower fuel consumption. By reducing emissions of air pollutants, the adoption of alternative fuels can improve air quality, protect public health, and support sustainable development in communities across Australia, particularly in urban areas with high traffic volumes.

The ATA and the Truck Industry Council (TIC) prepared a submission for the Low Carbon Liquid Fuels – A Future Made in Australia consultation. This submission is attached to support the information detailed above.

7. Removing barriers to the use of low or zero carbon vehicles

This section deals with the potential of battery electric and hydrogen trucks. Battery electric and hydrogen trucks have the potential to play an important role in Australia's future trucking industry. The disparity between the maturity of these two technologies is broad, and in some instances, it is appropriate to refer to electric vehicle technologies only. Some of the upcoming recommendations recognise this disparity and refers to electric vehicles (EVs) specifically. References to low and zero carbon vehicles include both battery electric and hydrogen technologies.

34 per cent of Australia's road freight task is carried out in capital cities and other urban areas. 44 per cent of this task is carried out by light commercial vehicles and rigid trucks.[16] This part of the freight task offers immediate opportunities for electrification.

The 56 per cent of the urban freight task that is carried out in articulated trucks also has the potential for electrification, although Australia's vehicle mass limits are an issue.

Although these prospects are impressive, it should be emphasised that low and zero carbon trucks are not suitable for every transport use case. For example, it is unlikely that remote or heavy haulage trucking will be electrified soon.

The ATA advises reform of mass and dimension regulations to accommodate the additional weight and size of low and zero carbon vehicles. Current standards will have to be reviewed to allow heavier low and zero carbon vehicles on roads. Battery technology will have to evolve further to impact the current weights substantially. Reviewing current regulations and aligning them to allow the uptake of electric vehicles will create immediate impact for the uptake of low and zero carbon trucks.

The Australian Government must work with state and territory authorities to eliminate regulatory constraints, such as width and mass limits, to facilitate compliance with Euro VI standards. The implementation of Euro VI entails manufacturers integrating advanced safety and fuel-saving technologies into Australian models, aligning them with counterparts in other countries.

However, while adjustments to mass limits are aimed at supporting Euro VI, they alone cannot fully mitigate the productivity setback faced by electric trucks due to their heavy batteries. For example, the current steer axle mass limit in Australia, set at 6.5 tonnes, will continue to hinder the deployment of larger battery electric truck models. Although battery

[15] A cetene number is a measure of a fuel's ignition delay which is the time period between the start of injection and the first identifiable pressure increase during combustion of the fuel.
[16] ABS, Survey of motor vehicle use, 2020. Table 21.

technology may evolve to become lighter over time, further revisions to mass limits will be imperative to eliminate this productivity bottleneck and expand the range of low and zero carbon trucks available in Australia.

The substantial upfront costs associated with transitioning to low and zero carbon heavy vehicles will persist as significant challenges even after regulatory barriers are lifted. The Government must develop solutions to guarantee the supply, adoption, and operation of low and zero carbon heavy vehicles. Further reforms to mass limits will be necessary to overcome the productivity penalty that low and zero carbon trucks face because of their heavy batteries and to increase the supply of low and zero carbon trucks in Australia.

Regulatory barriers to the supply and purchase of electric trucks

The ATA/EVC report identified the need to reform the Australian Design Rules to accelerate the take up of electric trucks. These reforms need to comprise -

- aligning Australia's truck width rules with international markets
- increasing the general mass limits for electric trucks.

Aligning truck widths with international markets

Until October 2023, trucks in Australia had a maximum width of 2.5 metres. Trucks in Europe are 2.55 metres wide (2.6 metres for refrigerated vehicles); trucks in the United States are 2.6 metres wide.[17]

Australia's width rules meant that every European and North American truck model had to be redesigned for the Australian market. This has reduced the availability of vehicle models and increased their cost.

Australian Design Rule 43/04 increased the maximum width of rigid trucks and prime movers to 2.55 metres, provided they comply with a package of additional safety rules.[18]

Over time, this design rule will improve the availability of new trucks in Australia, including electric trucks. But further reforms to truck width are needed.

Allowing 2.6-metre-wide refrigerated trucks

The ATA has long argued that increasing the thermal efficiency of refrigerated trucks should be a priority, given the energy use involved in keeping freight cold in Australia's warming climate.

Extending the width of refrigerated trucks to 2.6 metres would deliver a considerable reduction in heat leakage because their side insulation could be thicker. This would reduce the fuel or other energy consumption needed to keep the freight compartment cold and expand the use case for battery electric refrigerated trucks.

[17] ATA and Electric Vehicle Council, Electric trucks: keeping shelves stocked in a net zero world. January 2022, 14.
[18] *Vehicle Standard (Australian Design Rule 43/04 – Vehicle Configuration and Dimensions) 2006*, s 6.1.5.2.

It should be noted that a 2.55-metre-wide truck already occupies a 2.6 metre wide envelope, since the ADRs allow equipment such as cross view mirrors, monitoring devices and tyre pressure gauges to extend up to 100 mm in total beyond the overall width of the vehicle.[19]

Recommendation: Amend ADR 43/04 to allow refrigerated trucks to be 2.6 metres wide.

Extending the wider width to trailers

The increased width allowed under ADR 43/04 is only available for rigid trucks and prime movers, not trailers such as semitrailers.[20] There is no safety or operational reason for this restriction.

The safer freight vehicles concept in ADR 43/04 should be extended to trailers, which should be subject to the same additional safety requirements, where relevant, as rigid trucks and prime movers.

Consistent with the above recommendation, refrigerated trailers should be allowed to be 2.6 metres wide. Thermal heat loss associated with a refrigerated vehicle increases with its length.

Flat-sided fridge trailers are considered relatively safe due to their lack of protrusions, which can reduce the risk of injuries in collisions with pedestrians and other road users. The smooth surfaces of these trailers enhance vehicle stability and aerodynamics, contributing to overall road safety. Increased aerodynamic properties can lead to less fuel use.

Recommendation: Amend ADR 43/04 to extend the safer freight vehicles concept to trailers. Refrigerated trailers should be allowed to 2.6 metres wide.

Increasing the mass allowed for low and zero carbon trucks

Batteries and fuel cells are heavy. Australia's truck mass limits, and particularly the 6.5 tonne steer axle mass limit, are holding back the deployment of larger electric truck models.[21]

Several states have recognised this issue and now allow heavier electric trucks to use selected roads. Some of these additional mass arrangements are in table 1.

Table 1: Additional mass arrangements for electric trucks, selected states

State	Mass arrangement
New South Wales	Two-year access trial with up to 8t on a single steer axle and up to 18.5t on the drive axle[22]

[19] *Vehicle Standard (Australian Design Rule – Definitions and Vehicle Categories) 2005,* s 7 (definition of 'overall width).
[20] ADR 43/04 provides that the 2.55 metre width option only applies to vehicle categories NB2 (a medium goods vehicle with a GVM over 4.5t and up to 12t) and NC (a heavy goods vehicle with a GVM exceeding 12t). Trailers are categorised separately.
[21] ATA and EVC, 2022. 14.
[22] Transport for NSW, Towards net zero emissions freight policy. Website viewed 19 March 2024.

Victoria	Pre-approved arterial and municipal road network that can be used by the operators of Volvo semitrailer FM and FH models (7.5t steer and 44.0t)[23]
Queensland	Access for zero emission heavy vehicles with a steer axle mass of up to 8 tonnes on selected routes in southeast Queensland[24]
South Australia	Trial scheme allowing eligible trucks to operate on a selected road network. Single steer prime movers limited to 7.5t.[25]

While they are a good first step, these trials and road networks are necessarily restricted. They have inconsistent requirements and do not join up.

The steer axle mass limit for low or zero carbon trucks should increase across Australia later this year, as part of the adoption of Australian Design Rule 80/04. ADR 80/04 primarily mandates the Euro VI and comparable US/Japanese noxious emissions standards for diesel trucks, but electric and hydrogen trucks will be considered to comply.[26]

The NTC has validated that a 500 kg increase in steer axle mass is justified to offset the weight of the emission controls needed to meet the Euro VI standard, as well as other recent and near future regulatory requirements.[27] If adopted by governments, this increase – from 6.5 tonnes to 7 tonnes – would apply to electric and hydrogen trucks too.

But a 500 kg mass increase, while welcome, is still not sufficient to support the use of heavier electric trucks.

At present, an increase in single steer axle mass to 8 tonnes is needed so operators can move from conventional to electric equipment without compromising their vehicle's payload and productivity. The tandem drive rear axle limit should increase by 1.5 tonnes.

The allowed single steer axle mass for electric trucks should ultimately rise to 8.5 tonnes, with tandem drive rear axle mass increasing by 2 tonnes.

These increases in vehicle mass will require road and bridge upgrades.

In our 2024-25 pre-budget submission, we argued that the Government should invest in a new $5 billion truck roads and rest areas program over the 10-year infrastructure pipeline.[28]

Funding under the program would be subject to assessment by an independent panel, including industry representatives and truck drivers. All projects would be linked to outcomes, including projects to upgrade roads and bridges to handle the higher mass needed for low and zero carbon trucks.

[23] VicRoads, Low or zero emission heavy vehicles. Website viewed 18 March 2024.
[24] Mellish, B (Queensland Minister for Transport and Main Roads). Queensland embraces zero emission heavy vehicles. Media release, 8 March 2024.
[25] Department for Infrastructure and Transport, Low and zero emission heavy vehicle trial scheme. Website viewed 18 March 2024.
[26] *Vehicle Standard (Australian Design Rule 80/04 – Emission Control for Heavy Vehicles) 2023*, s 5.
[27] De Rozario, A. *Euro VI mass increases*. NTC presentation to TMC 23, 16 October 2023.
[28] ATA, 2024-25 pre-budget submission. 25 January 2024.

Recommendation: The Government should amend the Australian Design Rules to deliver an 8-tonne single steer axle mass limit and a 1.5 tonne increase in the tandem drive rear axle mass limit for low or zero carbon trucks.

In the longer term, the single steer axle mass limit should increase to 8.5 tonnes, with the tandem drive rear axle mass limit increasing by 2 tonnes.

Recommendation: The Government should invest an additional $5 billion in truck roads and rest areas over the ten-year infrastructure pipeline. The investment should include projects to upgrade roads and bridges to handle the mass requirements of electric trucks.

8. Incentivising the purchase of low or zero carbon vehicles

Supporting businesses to purchase electric trucks

Through the Australian Renewable Energy Agency (ARENA), the Government is funding a series of projects to roll out electric trucks. For example, ARENA is providing—

- $15.8 million to WA freight provider Centurion for 30 battery electric trucks and 15 dual port chargers[29]
- $20.1 million to Team Global Express for its Depot of the Future project, which will deploy 60 battery electric delivery vehicles.[30]

The ATA welcomes these projects, but ARENA's project-by-project approach can, at best, demonstrate the value of new technologies. It cannot support their implementation at scale.

It is time for the Government to put in place incentives that would be easily available to smaller trucking businesses, as well as other businesses that operate trucks.

The state governments could also support the rollout of electric trucks by removing stamp duty on these and other new trucks.[31]

Reinstating full expensing

The Government should permanently reinstate temporary full expensing for trucks and trailers.

Under temporary full expensing, an eligible business could fully expense in its tax return the cost of an eligible new asset first held, used or installed ready for use between 6 October 2020 and 30 June 2023. Temporary full expensing was available to businesses with an aggregate turnover of less than $5 billion.[32]

[29] ARENA, Decarbonising transport across Western Australia. Media release, 7 March 2024.
[30] ARENA, Depot of the future delivers Australia's largest electric vehicle logistics fleet. Media release, 6 December 2022. The depot was launched on 14 March 2024.
[31] ATA, 2024. 6.
[32] ATO, About temporary full expensing. Website viewed 16 March 2024.

During COVID, temporary full expensing proved to be highly effective at encouraging trucking businesses to invest in new trucks. For example, new truck sales in the December quarter 2020 were stronger than in the same period in 2019, despite the pandemic.[33]

Reintroducing full expensing for trucks and trailers on a permanent basis would do more than support the purchase of electric trucks. It would support a broad refresh of Australia's ageing truck fleet, which now has an average age of 16.3 years for heavy rigid trucks and 12.5 years for articulated trucks.[34]

No matter how they are powered, new vehicles are more efficient, have the latest safety technologies and meet more stringent noxious emissions standards.

Recommendation: The Australian Government should permanently reinstate full expensing for trucks and trailers.

Additional incentives for purchasing electric trucks

The higher upfront price of electric trucks is a key barrier to their take up in Australia.[35]

This aligns with international experience. A US non-profit that accelerates clean transport, CALSTART, has reported that—

> High incremental cost is cited by fleet purchases as the prime barrier preventing clean vehicle purchases. Incentives for the purchase of medium- and heavy-duty commercial vehicles are needed to help create a robust, sustainable market.[36]

Globally, a range of purchase price incentives now exist, such as CALSTART's voucher incentive program (VIP) model.

Under this model, the Government provides a voucher to reduce the incremental cost between a conventionally fuelled vehicle and a ZLEV. Dealer networks help fleets navigate the voucher incentive program process and take on the financial responsibility of completing voucher redemptions.

Truck purchasers see a lower purchase cost. Dealers receive the full price for the vehicles and the program makes up the difference between the original price and the reduced voucher price.

The ATA supports this model, because it could be available at the point of sale without the need for purchasers to undertake a separate application process.

A purchase price incentive of 50 per cent of the price difference between electric and conventional trucks would split the extra cost of purchasing an electric truck between the community and the purchaser.

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[33] Truck Industry Council, Truck market comment: fourth quarter, 2020. January 2021. 1.
[34] BITRE, Road vehicles, Australia, January 2023. 9.
[35] ATA and EVC, 16.
[36] CALSTART, Voucher incentive programs: a tool for clean commercial vehicle deployment. July 2019. ES-1.

We know that electric truck technology will become more cost effective as production scales up.[37] As the cost of the technology falls, the cost of the subsidy will fall also.

Recommendation: The Australian Government should implement a purchase price incentive of 50 per cent of the price difference between comparable electric and conventional truck models.

The above recommendations consider electric trucks but upon the commercial maturity of hydrogen technologies, such measures could be extended to facilitate the uptake of hydrogen powered trucks too.

Charging infrastructure

Providing truck charging infrastructure will be another key enabler of the transition to electric trucks.[38]

The Australian Government is investing in charging through its Driving the Nation fund. The fund intends to establish a national EV charging network and support an expansion of the Hydrogen Highways program. We support the fund's initial approach and would like to see the charging network upgrades rolled out as appropriate, but there is a missed opportunity for charging heavy vehicles.

We note that the fund's investments are focused on passenger vehicle charging and depot-based chargers. To support the purchase of battery electric trucks by time poor truck operators, the Government should increase its focus on building public rapid and ultra-fast recharging infrastructure for trucks.

As bp has pointed out, fleet managers across markets say they want to de-risk charging, which for charging during the day is likely to mean getting vehicles charged with certainty as quickly as possible.[39]

The focus of building this charging infrastructure should be on key urban and freight locations, such as service stations in logistics precincts. The charging facilities should be designed so they can be easily used by trucks.

The rollout will also require grid upgrades, including improvements in electricity network data sharing, support for second lines of supply to charging sites and service stations, and supportive tariff structures for charge point operators.

Recommendation: The Australian Government should increase its focus on rapid and ultra-fast charging infrastructure for trucks, including through supporting upgrades to the power grid and its operation.

[37] ICCT. A meta-study of purchase costs for zero-emission trucks. February 2022. 14, 15.
[38] ATA and EVC, 16.
[39] bp Australia, bp Australia response to the National Electric Vehicle Strategy consultation paper. October 2022. 4.

9. Higher productivity vehicles

Higher productivity vehicles are also safer vehicles. Many productivity measures are supported by comprehensive safety features with a view to continually improving the safety of the fleet. Safer vehicles on our roads protects the public interest while contributing to a low carbon future.

The key benefit of reducing barriers for the use of low and zero carbon trucks is that the safety and productivity benefits can be enjoyed by the current fleet, allowing for even greater carbon emissions reduction across the heavy vehicle sector.

High productivity vehicles can carry more load per trip, meaning less trucks are required to transport the same load. This leads to lower fuel consumption on a per tonne-kilometre basis. With fewer trucks making fewer trips, operating costs such as fuel, maintenance and labour are reduced, resulting in overall cost savings for operators.

These fewer trips produce less tailpipe emissions and carbon emissions, supporting the government's environmental targets, and fewer trucks means less wear and tear on infrastructure, leading to lower average maintenance costs.

In terms of safety, higher productivity vehicles incorporate advanced technology such as improved braking systems, stability control, and better load distribution, all of which enhance road safety. Fewer trips can also mean less traffic congestion, lowering the risks of accidents on the road.

Productive vehicles are efficient vehicles, contributing to increased productivity for businesses who rely on the timely delivery of goods. This same efficiency can benefit regional and remote areas by providing a better supply chain with better access to markets and reduced transportation costs.

Key configuration comparison

Comparison of key road freight delivery configurations

	Semi Trailer	B-double		A-double	
GCM (tonne) GML	43.0	63.0		79.5	
			147%		185%
Maximum Combination Length (metres)	19.0	26.0		36.5	
			137%		192%
Payload (tonne)	24.0	38.8		48.7	
			162%		203%
Trips per 1,000 tonnes of payload moved	42	26		21	
			62%		50%
ESA's per 1,000 tonnes of payload moved	304	224		225	
			74%		74%
Fuel required per 1,000 km lead	100%	82%		72%	
Driver requirement	100%	62%		50%	

The relative merits of higher productivity vehicles are demonstrated above.

A B-double combination has approximately 74% of the road impact, uses 82% of the fuel, and requires only 62% of the trips to move the same amount of payload (1,000 tonnes) as a semi-trailer.

An A-double combination has about 74% of the road impact, uses 72% of the fuel, and requires only half the number of trips to move the same amount of payload (1,000 tonnes) compared to a semi-trailer.

For higher productivity vehicles, reductions in carbon emissions (CO_2-e) are achieved by moving more payload with fewer trucks. As a result, there is a reduction of both noxious and carbon emissions because of a direct reduction in diesel consumed.

Emissions standards comparison

The following table compares carbon emissions from different emissions standards. It is based on data from Australian National Greenhouse Accounts Factors. Scope 1 emissions are a significant contributor to the overall carbon footprint of the heavy vehicle sector.

The table below quantifies the emissions reductions achievable through the use of different fuel types and emissions standards, illustrating the impact of cleaner fuels and technologies.

SCOPE 1 Emissions for Transport involving Heavy Vehicles							
	t CO_2-e						
	Liquified Natural Gas (LNG)	Diesel Oil			Renewable Diesel		
Diesel (litres)		ADR80/02 (Euro IV) or higher	ADR80/00 (Euro III)	ADR70/00 (Euro I)	ADR80/02 (Euro IV) or higher	ADR80/00 (Euro III)	ADR70/00 (Euro I)
10.0	13.79	27.16	27.17	27.21	0.18	0.19	0.23
20.0	27.58	54.33	54.35	54.43	0.36	0.39	0.46
30.0	41.37	81.49	81.52	81.64	0.54	0.58	0.69
40.0	55.15	108.65	108.70	108.85	0.73	0.77	0.93
50.0	68.94	135.81	135.87	136.07	0.91	0.97	1.16
60.0	82.73	162.98	163.05	163.28	1.09	1.16	1.39
70.0	96.52	190.14	190.22	190.49	1.27	1.35	1.62
80.0	110.31	217.30	217.40	217.70	1.45	1.54	1.85
90.0	124.10	244.47	244.57	244.92	1.63	1.74	2.08
100	137.89	271.63	271.74	272.13	1.81	1.93	2.32

Scope 1 emissions or direct emissions are produced from sources within the boundary of an organisation and as a result of that organisation's activities. They are calculated at the point of emission release. These emissions include those from the following activities:

- Generation of energy, heat, steam and electricity, such as fuel combustion in generators;
- Manufacturing processes which produce emissions such as cement, aluminium and ammonia production;
- Transportation of materials, products, waste and people; such as the use of vehicles owned and operated by the reporting organisation;
- Intentional or unintentional GHG releases (fugitive emissions) such as methane emissions from coal mines, natural gas leaks from joints and seals; and
- Solid waste disposal and wastewater treatment including on-site waste management

In the case of transport, Scope 1 emissions are tail pipe emissions. The table shows the substantial emissions reductions that can be achieved through newer, stricter emissions standards and alternative fuels. This supports our recommendations for regulatory reforms to accelerate the uptake of low carbon liquid fuels (see attached submission). The table demonstrates the potential for reduced fuel consumption which if realised, would provide economic benefit to operators. The table also provides empirical evidence supporting the alignment with international emissions standards. As stated previously, the Australian Government must work with state and territory authorities to eliminate regulatory constraints, such as width and mass limits, to facilitate compliance with Euro VI standards.

Generally, a truck's fuel consumption increases at a slower rate than the increase in the truck combination's payload. However, as payload increases, the combination's ability to accelerate is reduced (i.e., keeping up with traffic), hill climbing ability is diminished, and

manoeuvrability around roads is compromised, limiting the physical road network options available for the combination.

Productive trucks are safer trucks

The report 'Review of Major Crash Rates for Australian Higher Productivity Vehicles: 2015 – 2019' shows an overall improvement in safety outcomes of 60% compared to the conventional fleet on a distance travelled basis. This marks a significant increase over a 2017 report, which found a 46% improvement.

When comparing conventional rigid trucks (with or without trailers) to their Performance-Based Standards (PBS) equivalents, the improvement in safety is slightly less pronounced but still notable at 47.3% on a distance travelled basis. PBS articulated combinations had the lowest rate of crashes per distance travelled, with 5.4 crashes per 100 million kilometres travelled, which is almost 70% lower than the rate for their conventional counterparts.

The table below reflects the benefits of using High Productivity Freight Vehicles (HPFV) as published by Austroads.[40]

Accident type by severity Rate per 100 km		Minor	Moderate	Serious	Major	Total accidents	Total serious & major accidents
Conventional Trucks	Articulated (69%)	21	22	16	13	72	29
	Rigid Truck (31%)	42	34	19	7	102	26
Conventional incident weight , total		27.5	25.7	16.9	11.1	81.3	28
HPFVs	Articulated (69%)	8	2	2	5	18	7
	Rigid Truck (31%)	20	26	4	2	53	6
Observed HPFVs incident weighted total		11.7	9.4	2.6	4.1	27.9	6.7
Total HPFVs incident savings (rate per 100 km)		15.8	16.3	14.3	7.1	53.5	21.4
Observed HPFVs weight incident savings (%)		57%	63%	85%	63%	66%	76%

Promoting cleaner and safer options for freight will not only benefit the environment but also improve the overall efficiency and safety of our transport network.

1. Enhanced safety: Safer heavy vehicles equipped with advanced safety features, such as automated braking systems, lane-keeping assistance, and improved visibility, will significantly reduce the risk of accidents. This will lead to fewer injuries and fatalities, enhancing the well-being of all road users.

[40] Austroads report FS1805 – Quantifications of the benefits resulting from the use of HPFVs.

2. Environmental benefits: Cleaner heavy vehicles, including those using alternative fuels will reduce greenhouse gas emissions and air pollution. This is crucial for meeting Australia's environmental targets and improving air quality in urban areas.
3. Increased productivity: More productive heavy vehicles, designed for higher payloads and better fuel efficiency, will reduce the number of trips required to transport goods. This will lower operational costs, decrease road congestion, and enhance the overall efficiency of the freight industry.
4. Compliance with regulations: Promoting safer and cleaner heavy vehicles aligns with national and international regulatory standards. Ensuring that the fleet complies with evolving safety and environmental regulations will mitigate the risk of penalties and enhance the industry's reputation.

Recommendation: Promote safer and more productive heavy vehicles – cleaner and safer options for freight

The trucking industry is pivotal to our nation’s economy, ensuring the movement of goods across vast distances. As we transition towards a more sustainable and efficient future, it is essential to enhance access and productivity for both the existing fleet, electric trucks, and emerging low and zero carbon trucks. A critical component of this transition is understanding and upgrading the capacity of key freight roads and structures.

1. Enhanced efficiency and reduced delays: Upgrading the capacity of key freight routes and structures will streamline transportation, reducing bottlenecks and improving delivery times. This will enhance the efficiency of the entire logistics network, providing economic benefits through cost savings and increased productivity.

2. Support for electric vehicles: We are witnessing a gradual shift in the supply and choice of electric vehicles, which offer significant environmental benefits. Upgrading infrastructure to support these vehicles, including charging stations and weight-bearing structures, is crucial to facilitate their integration into the fleet and ensure their operational viability.

3. Safety and compliance: Understanding and upgrading key freight roads and structures will also enhance safety for all road users. Improved infrastructure can reduce the risk of accidents, ensure compliance with safety standards, and support the heavy vehicle industry in meeting regulatory requirements.

Recommendation: Facilitate access and productivity measures for the existing fleet and electric vehicles by understanding and upgrading capacity of key freight roads and structures