

Transport and Infrastructure Net Zero Consultation Roadmap

Take the survey


Department of Climate Change, Energy, Environment and Water

Response received at:

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- 1 Confirm that you have read and understand this privacy notice.
Yes
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Truck Industry Council
- 4 Confirm that you have read and understand this declaration.
Yes
- 5 First name
Anthony
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McMullan
- 7 Email


- 8 Phone
[REDACTED]
- 9 Who are you answering on behalf of?
Organisation
- 10 Organisation name
Truck Industry Council
- 11 What best describes you or your organisation?
Industry
- 12 What sector do you represent?
Heavy road vehicles (trucks, buses etc.)
- 13 What state or territory do you live in?
Australian Capital Territory
- 14 Postcode
2612
- 15 What area best describes where you live?
City
- 16 1. Do you support the proposed guiding principles?
Not answered
- 17 1.1 Please add details to your response.
Not answered
- 18 2. Do you support the use of the avoid-shift-improve framework as a tool to identify opportunities for abatement?
Not answered

- 19** 2.1 Please add details to your response.
Not answered
- 20** 3. Do you agree the development of a national policy framework for active and public transport will support emissions reduction?
Not answered
- 21** 3.1 Please add details to your response.
Not answered
- 22** 4. What should be included in a national policy framework for active and public transport and how should it be developed?
Not answered
- 23** 5. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure the movement of people contributes to transport emissions reduction?
Not answered
- 24** 6.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure that the movement of goods contributes to transport emissions reduction?
Not answered
- 25** 6.2. How would these actions address the identified challenges and opportunities for emissions reduction in the movement of goods?
Not answered
- 26** 7. Do you agree with the proposed net zero pathway for light road vehicles?
Not answered

- 27 7.1 Please add details to your response.
Not answered
- 28 8. The Australian Government is currently developing an Australian New Vehicle Efficiency Standard and has already begun to implement actions in the National Electric Vehicle Strategy.8.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce light vehicle emissions?
Not answered
- 29 8.2 How would these actions address the identified challenges and opportunities to reduce light vehicle emissions?
Not answered
- 30 9. Do you agree with the proposed net zero pathway for heavy road vehicles?
Not answered
- 31 9.1 Please add details to your response
Not answered
- 32 10. The proposed pathway for heavy road vehicles relies on a mix of battery electric, hydrogen fuel-cell and low carbon liquid fuels.Rank from 1 to 3, the order in which these should be prioritised for emissions reduction.
Not answered
- 33 10.1 Please add details to your response. Why did you rank them in that order?
Not answered
- 34 11. What role should low carbon liquid fuels play in the heavy vehicle

decarbonisation?

Not answered

- 35 12. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce heavy vehicle emissions?

Not answered

- 36 13. Do you agree with the proposed net zero pathway for rail?

Not answered

- 37 13.1 Please add details to your response.

Not answered

- 38 14. The proposed pathway for rail relies on a mix of battery electric, hydrogen fuel-cell and low carbon liquid fuels. Rank from 1 to 3, the order in which these should be prioritised for emissions reduction.

Not answered

- 39 14.1 Please add details to your response. Why did you rank them in that order?

Not answered

- 40 15. What role should low carbon liquid fuels play in rail decarbonisation?

Not answered

- 41 16. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce rail emissions?

Not answered

- 42 16.1 How would these actions address the identified challenges and

opportunities to reduce rail emissions?

Not answered

43 17. Do you agree with the proposed net zero pathway for maritime?

Not answered

44 17.1 Please add details to your response.

Not answered

45 18. The Australian Government is engaging in consultation as part of the development of the Maritime Emissions Reduction National Action Plan and those consultations will also inform the final Roadmap and Action Plan. 18.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce maritime emissions?

Not answered

46 18.2 How would these actions address the identified challenges and opportunities to reduce maritime emissions?

Not answered

47 19. Do you agree with the proposed net zero pathway for aviation?

Not answered

48 19.1 Please add details to your response.

Not answered

49 20. The Australian Government has already engaged in consultation on aviation decarbonisation through the development of the Aviation White Paper and those consultations will also inform final Roadmap and Action Plan.

Not answered

- 50 20.1 What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce aviation emissions?
Not answered
- 51 21. Do you agree with the proposed net zero pathway for transport infrastructure?
Not answered
- 52 21.1 Please add details to your response.
Not answered
- 53 22. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to reduce transport infrastructure emissions and ensure that transport infrastructure is ready for and enables low-emission transport modes?
Not answered
- 54 22.1 How would these actions address the identified challenges and opportunities to reduce transport infrastructure emissions?
Not answered
- 55 23. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure the energy mix is ready to support transport emissions reduction?
Not answered
- 56 24. How should the use of low carbon liquid fuels (LCLFs) be prioritised across different transport modes over time to achieve maximum abatement?
Not answered

- 57 25. What are the best ways for the Australian Government to work collaboratively with industry, business, governments and communities to implement the proposed pathways?
Not answered
- 58 25.1 What are good domestic or international examples of partnership and collaboration on transport and transport infrastructure emissions reduction that could inform the final Roadmap and Action Plan?
Not answered
- 59 25.2 What opportunities can Government leverage to show leadership in Australia and internationally?
Not answered
- 60 26. What measures and metrics should be used to evaluate the final Transport and Infrastructure Net Zero Roadmap and Action Plan?
Not answered
- 61 26.1 What other data and evidence could governments use and how could this offer further insights on the pace, scale and location of transport emissions reduction pathways?
Not answered
- 62 27. Do you have any feedback on the proposed review process?
Not answered
- 63 28. Do you have any further feedback on the Consultation Roadmap and proposed pathways?
Not answered
- 64 28.1 Is there anything missing? Are the sections appropriately integrated? Is the Roadmap appropriately ambitious?
Not answered

65 29. Is there any further information or documentation that you wish to be considered with your submission?

Not answered

66 Would you like to upload a document?

Yes

67 Have you removed any identifying information from your submission?

Yes

68 Upload a submission

Truck Industry Council response to DoITs Net Zero Transport Consultation Roadmap - 6 August 2024.pdf

69 Upload a submission

Truck Industry Council response to DCCEE Low Carbon Liquid Fuels Consultation Paper - 24 July 2024.pdf

70 Upload supporting file

Not answered

71 Upload supporting file

Not answered



6th August, 2024

**Department of Infrastructure, Transport,
Regional Development, Communications and the Arts
GPO Box 594, Canberra ACT 2601**

Submissions: <https://infrastructure.gov.au/netzeroroadmap>

Subject: The Truck Industry Council's response to Department of Infrastructure, Transport, Regional Development, Communications and the Arts, *Transport and Infrastructure Net Zero Consultation Roadmap – May 2024*

The Truck Industry Council (TIC) is the peak industry body and advocacy voice representing manufacturers and distributors of heavy commercial vehicles (that is, with Gross Vehicle Mass above 3.5t) or “trucks” in Australia. TIC members are responsible for producing or importing and distributing 17 brands of truck for the Australian market, totalling almost 48,000 trucks in 2023. In 2023, TIC members supplied to market over ninety-nine (99) percent of all new on-highway trucks above 4.5 tonne Gross Vehicle Mass (GVM) sold in Australia.

Further, TIC also comprises two dedicated engine manufacture members and two dedicated driveline manufacture member who supply major engine and driveline systems for both on highway and off highway “truck” applications.

Today, 16 of the 17 truck brands represented by TIC offer diesel powered trucks in Australia; 6 of these brands also offer battery electric trucks (July 2024) - This will grow to 9 brands by the conclusion of 2024/early 2025; 1 of these brands offers diesel/electric hybrid trucks; and the 17th brand exclusively offers battery electric trucks. The transition to a heavy vehicle low and zero emission future has already started.

A current list of TIC members can be found at the end of this submission.

Opening statement

The Truck Industry Council (TIC) believes that all levels of Australian Governments should avoid setting low carbon mobility policy that favours specific technologies and/or pathways over others, thus amounting to picking ‘winners’ in the decarbonisation pursuit. Such an approach not only risks unintended consequences but may also result in shutting out currently non favoured technologies and/or pathways because their potential abatement benefits are not immediately visible to policy makers. This principle is acutely important in the heavy vehicle road freight sector which must provide extremely diversified tasks/roles to all Australians and our nation’s economy. TIC believes the best approach will need one that adopts a suite of decarbonisation solutions if it is to achieve net zero by 2050. It is also important to recognise that differing technologies and/or pathways will need to be deployed in the heavy vehicle sector over the coming decades, typically due to the maturity of specific technologies. Hence, government policy should not ‘lock’ the heavy vehicle

sector into any one specific technology or pathway. Policy decisions must remain agile and evolve over time to foster the best decarbonisation outcomes throughout the transition to net zero.

The principal of 'not picking winners' should not be confused with the requirement to remove regulatory and financial barriers, that unnecessarily slow, or even prevent, the uptake of new decarbonisation technologies/pathways. An example would be the additional axle mass required for a battery, or hydrogen, electric truck. This is required to off-set the technology's additional Tare weight compared to an equivalent diesel powered truck. In this case, the regulatory change is required to 'level the playing field' for the zero emission truck due to its technology deficiency (significant additional tare weight), that if not compensated for by regulatory change, would render the zero emission truck at a significant commercial disadvantage. An increase in TARE mass reduces the ability to carry payload mass), and when compared to an equivalent diesel powered truck, places the zero emission vehicle at a productivity disadvantage for the same size internal combustion powered truck.

The first part of this submission will outline the current road freight task, the size and make-up of the current Australian truck fleet, emission intensity of the sector, asset life and additional core factors. An understanding of these parameters is required to appreciate the size of the decarbonisation mission facing the heavy vehicle road freight sector as well as the pathways, current and future, that could be deployed in order to transition to a low carbon future.

Introduction

The Australian Transport Sector accounts for just over 90 Mt CO₂ emissions (or 18%) of Australia's annual GHG emissions. The operation of Australia's national heavy duty truck fleet generates 19.8 MT CO₂ emissions (or 22%) of all Transport Sector emissions, which equates to about 4% of Australia's total annual GHG emissions.

The Transport Sector has experienced the highest GHG emissions growth of all industry sectors since 1990 and is expected to become the largest source of GHG emissions by 2030, with the national vehicle fleet (both light-duty and heavy-duty vehicles) accounting for around 72% of the forecast 111 Mt CO₂ emissions to be generated by the Transport Sector in 2030.

Road Freight is the most significant mode of transportation for goods in Australia, accounting for approximately 75% of the total domestic freight moved in Australia by total volume. This proportion has remained largely unchanged since the late 1970's, due principally to the fact that Australia's sparsely populated geography and limited non-road freight infrastructure has meant that this is the most economic mode for movement of freight around the country.

Without significant (and costly) development of alternative national freight infrastructure, the road freight task will continue to grow at the rate of 3.5% to 4.0% per year (a 50% increase every 10 years). This is the typical growth rate that has been witnessed for this sector for decades now.

Constraining this annual growth rate is problematic – if not unrealistic - given that it is directly linked to growth in national economic output and national population. In addition, there are several contemporary trends that are further increasing growth of the national freight task. Chief amongst these trends is the following:

a) *The rise of the online economy and digital commerce.* This phenomenon has accelerated since COVID and is fundamentally reshaping the nature of the urban road freight task in Australia - from one that was previously optimized around the realization of freight efficiencies (i.e. between manufacturers, distribution centres, and retailers) to one that is increasingly being designed to optimize delivery times for end-customers (i.e. from manufacturer to end customer). This trend is

fragmenting the freight task and has given rise to increased annual sales of new urban delivery trucks in recent years.

b) *Changes in logistics industry practices.* The past decade has seen a significant change in Australian supply chain practices where goods are no longer warehoused to reduce delivery times to Australian consumers. As a result, manufactured goods are typically transported directly ‘off the production line’, or ‘off the ship’, to retailers, or the end customer.

Further, the Australian truck fleet has an average age of approximately 14 years for all vehicles above 3.5t GVM and 14.8 years for trucks above 4.5t GVM (*BITRE Motor Vehicle Census 2023*). A sobering statistic is that a new truck sold in 2024 will not be retired from the national truck fleet until 2052 based on current truck fleet profile.

The Truck Industry Council has commissioned extensive CO₂ profile modelling of the current heavy vehicle fleet including a prediction of business as usual (BAU) emissions in 2025 and 2030. This work involved the construction of a 2020 baseline fleet using actual ABS Vehicle Census Data. Annual average fleet attrition rates (2015 to 2020) and annual truck sales data were then used to forecast the composition of the national truck fleet in 2025 and 2030. A summary of this modelling is provided below.

The findings of this work forecast that the size of the national truck fleet will increase by an estimated 108,000 trucks between 2025 and 2030 (and an increase of 166,000 when compared with the 2020 truck fleet). The net result is that the national truck fleet will increase to approximately 850,000 vehicles by 2030, up from 688,000 trucks in 2020. The analysis also predicts that 32% of the national truck fleet (272,960 trucks) will be over 21 years old in 2030.

The forecast architecture of the national heavy vehicle fleet in 2030 is detailed in Figure 1 below. The forecast age composition of the fleet (grouped by emissions ADR) is shown in Figure 2.

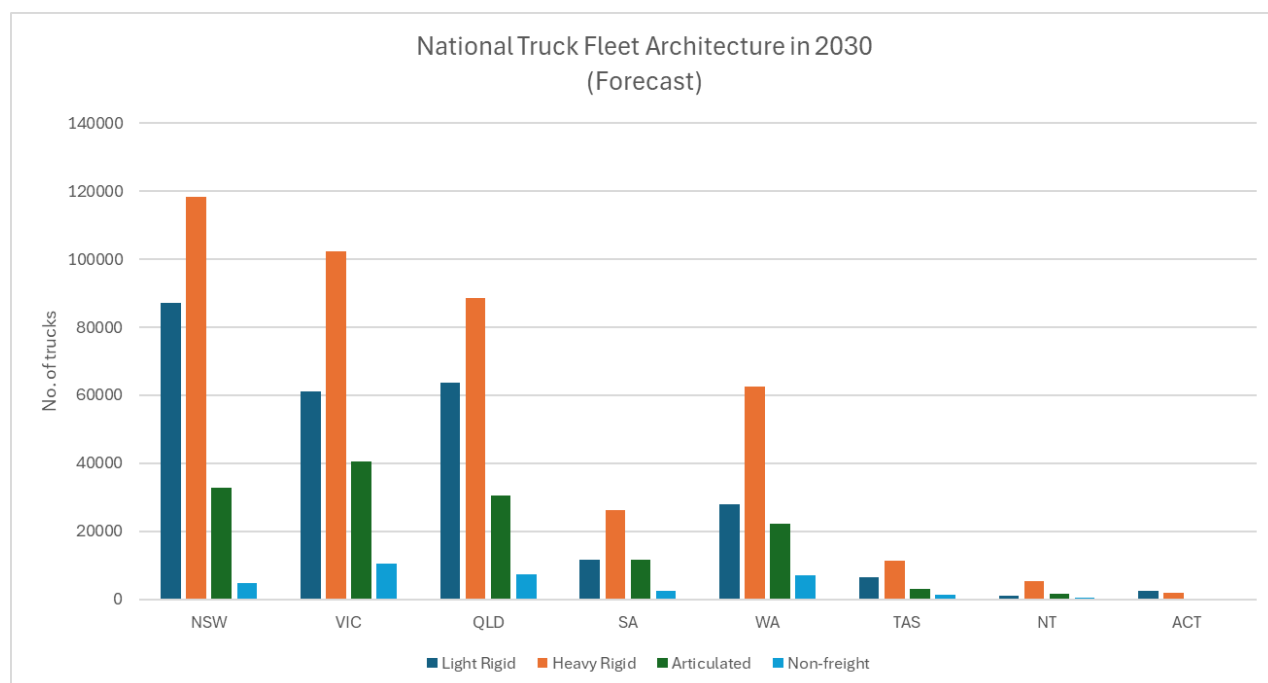


Figure 1: The national truck fleet will increase from 687,683 (2020) to an estimated 853,577 trucks (2030)

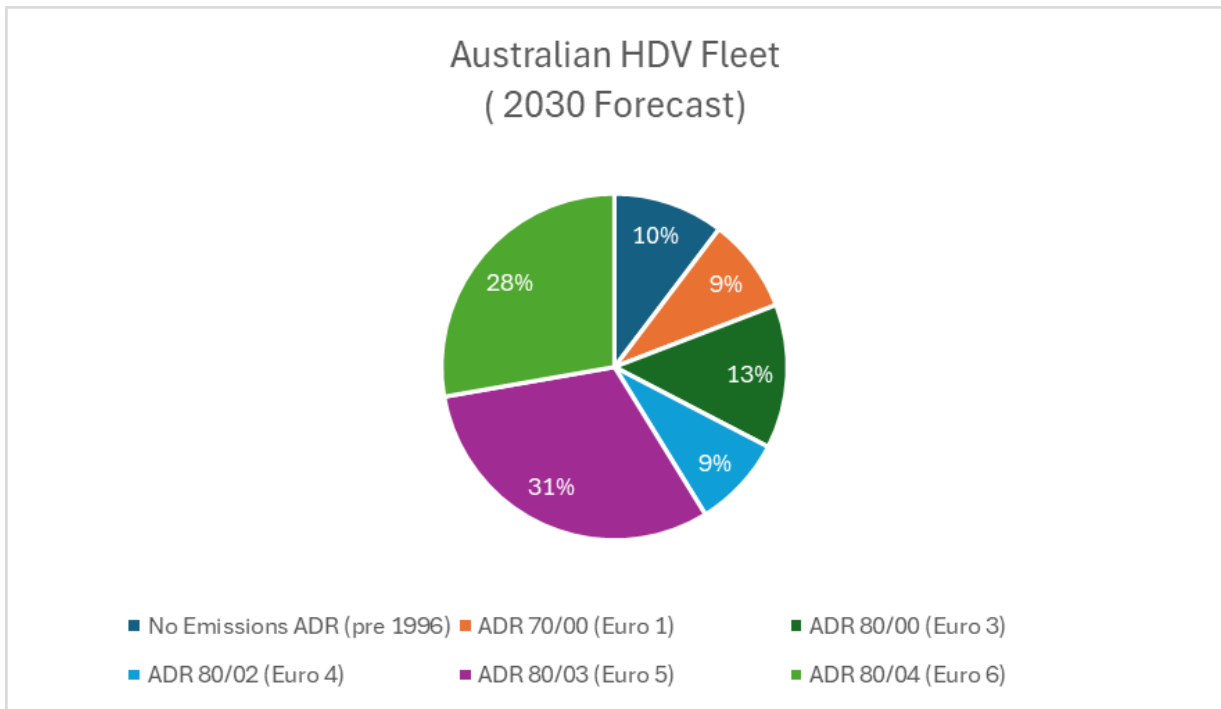


Figure 2: One third of the national truck fleet will be 21 years or older in 2030

The GHG emissions of the national heavy duty vehicle fleet are forecast to increase to 21.262 Mt CO₂ by 2030. This represents an increase of 2.667 Mt CO₂ (14%) above forecast 2025 levels and an increase of 4.052Mt CO₂ (23.5%) above 2020 levels as shown in Figure 3.

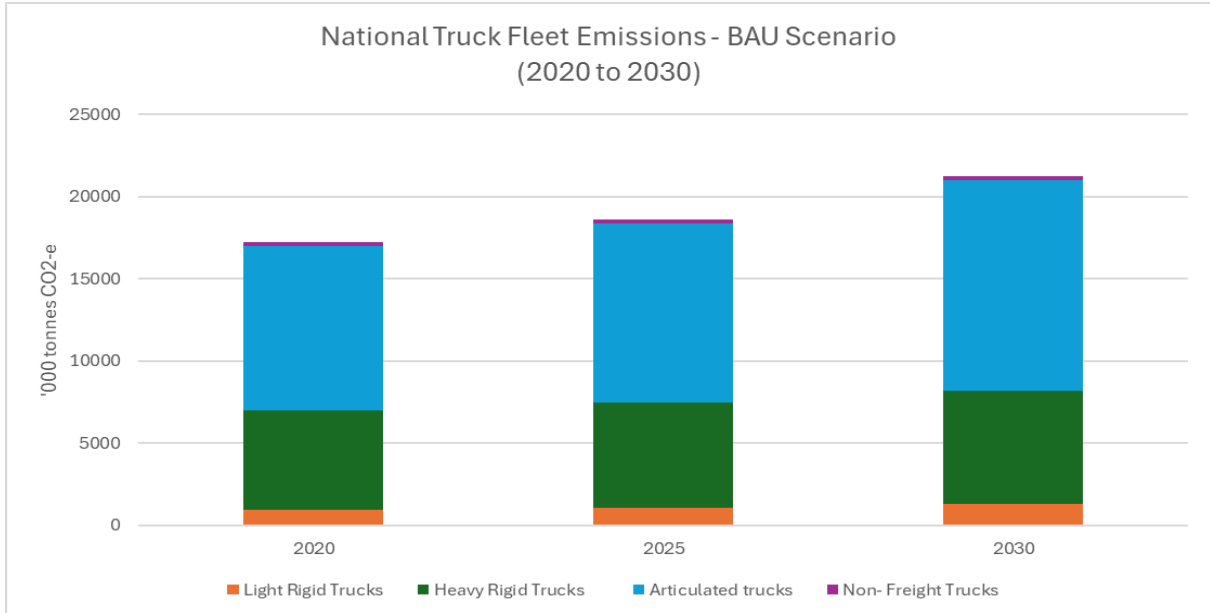


Figure 3: GHG emissions are forecast to increase by 4.052Mt CO₂-e between 2020 and 2030

GHG emissions from articulated trucks will account for 69% of the projected increase between 2020 and 2030 – and 60% of the total GHG emissions produced by the national truck fleet in 2030 (refer Figure 4).

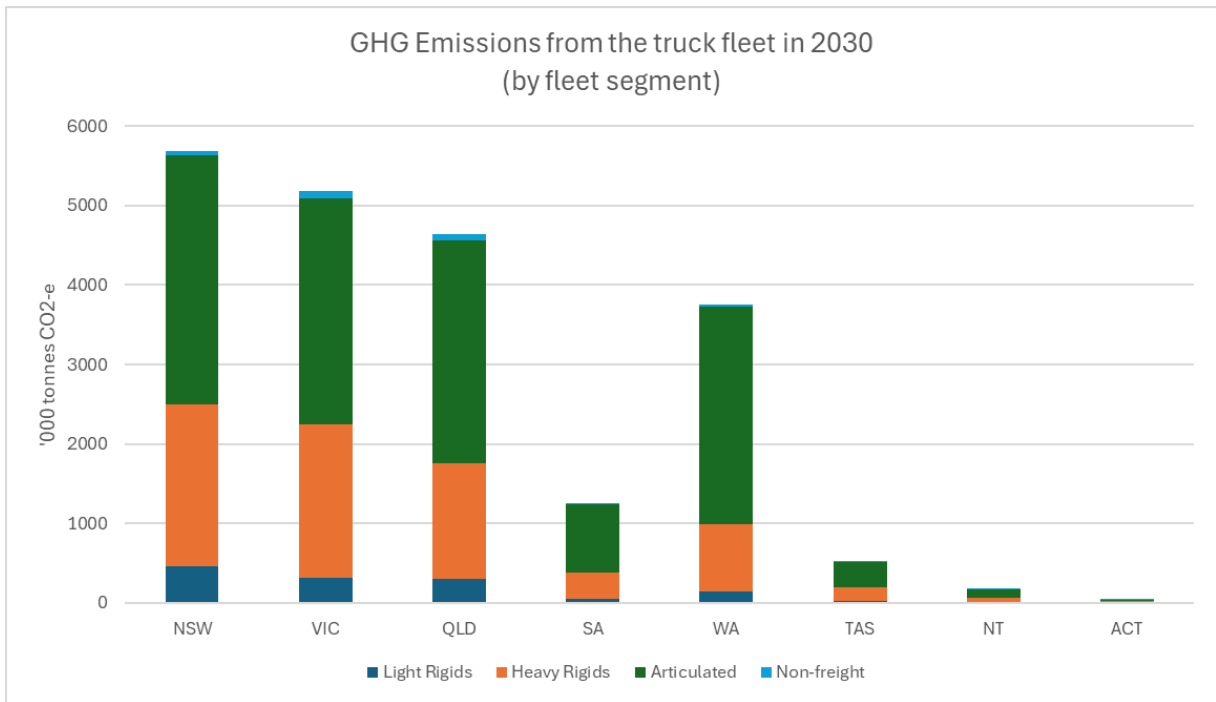


Figure 4: GHG emissions from articulated trucks are forecast to account for 60% of the total GHG emissions produced by the national truck fleet in 2030.

The GHG emissions production rate of a new articulated truck in 2030 is forecast to produce 5.5x more GHG emissions than a new heavy rigid truck, 10.9x more GHG emissions than a new non-freight truck, and 17.9x more emissions than a new light rigid truck (refer Figure 5).

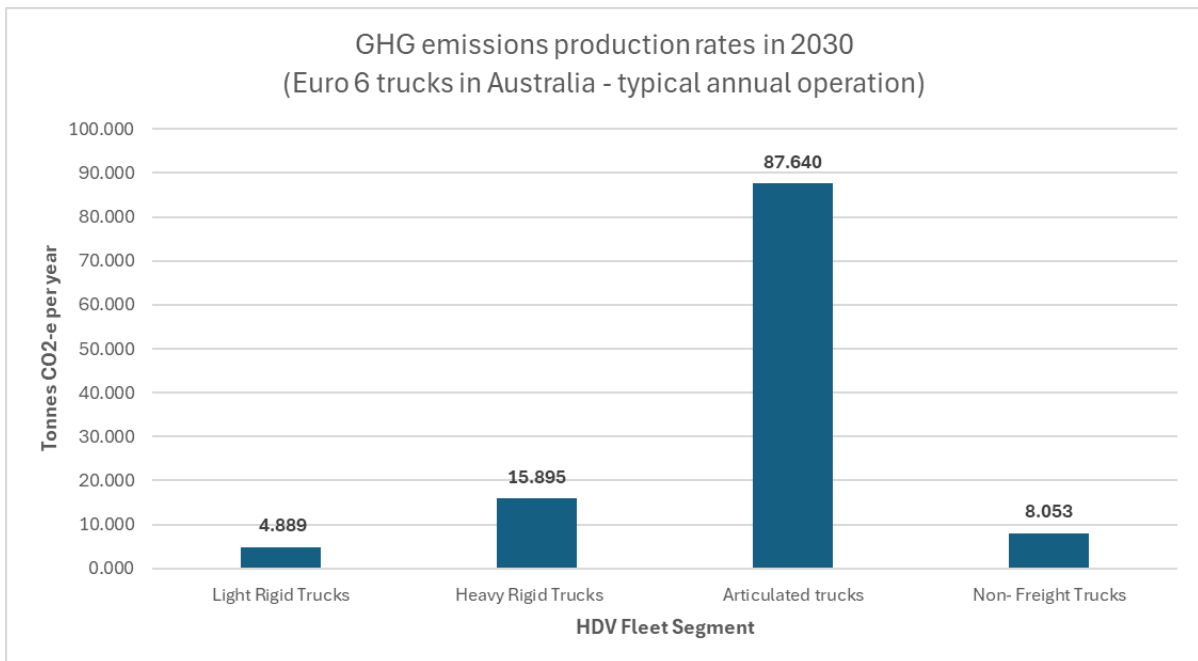


Figure 5: New articulated trucks will produce 5.5 times more emissions than new Heavy Rigid trucks and nearly 18 times more GHG emissions than new light rigid trucks in 2030

Over the next 5 years, to 2030, the greatest opportunity for the adoption of low carbon drivetrains is likely to be constrained to the early market entry of small numbers of BEVs within the lighter segments of the national truck fleet – that is, light rigid trucks and some heavy rigid trucks, operating primarily in city/metro/urban environments.

Supporting the above statement is the current sales trend for low carbon drivetrains. In 2023, the new sales uptake of zero emission and low emission (diesel/electric hybrid) trucks was approximately 1%, with an even split (50/50) between zero emission and low emission (hybrid) trucks. All (100%) these trucks were sold into city/metro/urban operations.

TIC is predicting slightly less than the doubling of sales of these vehicles year-on-year for the next 4-5 years. In 2030, TIC is forecasting that 1 in 4 (25%) of all new truck sales will be zero emission (over 12,000 trucks/year) and that by 2030 there will be over 20,000 zero emission trucks on Australian roads. However, that will represent less than 2% of the truck fleet. Almost all these trucks will be Light and Heavy Rigid trucks operating in metro/urban environments, travelling relatively short distances. They will be displacing diesel trucks with relatively low fuel usage, with the actual CO₂ reduction that these zero emission trucks will deliver, being an approximate, modest 1% of the total heavy vehicle truck fleet emissions.

By 2030 approximately 98% of trucks operating in the Australian truck fleet will still require diesel. This is further reinforced by the lack of suitable zero emission truck technology that currently exists for the Articulated Truck and the larger Heavy Rigid Truck (eg: tipper and dog) sectors. Predominantly, diesel engine trucks will be required up to and potentially beyond 2040, in these segments.

Hence due to the increasing, consumer driven freight task; the number, high average age and long asset life of the Australian heavy vehicle truck fleet; it is obvious that a transition away from diesel, particularly for the Articulated Truck and the larger Heavy Rigid Truck portion of the fleet is many years away. With these trucks accounting for more than 70% of heavy vehicle CO₂ emissions, low carbon liquid fuels (LCLFs) are the only practical solution for significant carbon abatement in the foreseeable future.

The following graph (refer Figure 6) shows the CO₂ abatement potential of different decarbonisation technologies and pathways between 2025 and 2030. In the main these abatement opportunities will require a combination of policy, regulatory and financial support, either directly (eg: financial sales support/tax incentives for the purchase of new low/zero emission vehicles), or indirectly (eg: funding initiatives, tax support, etc. to foster an Australian renewable fuel industry). The graph also shows the projected CO₂ increase from the heavy vehicle road freight sector due to the predicted growth in the Australian freight task between 2025 and 2030.

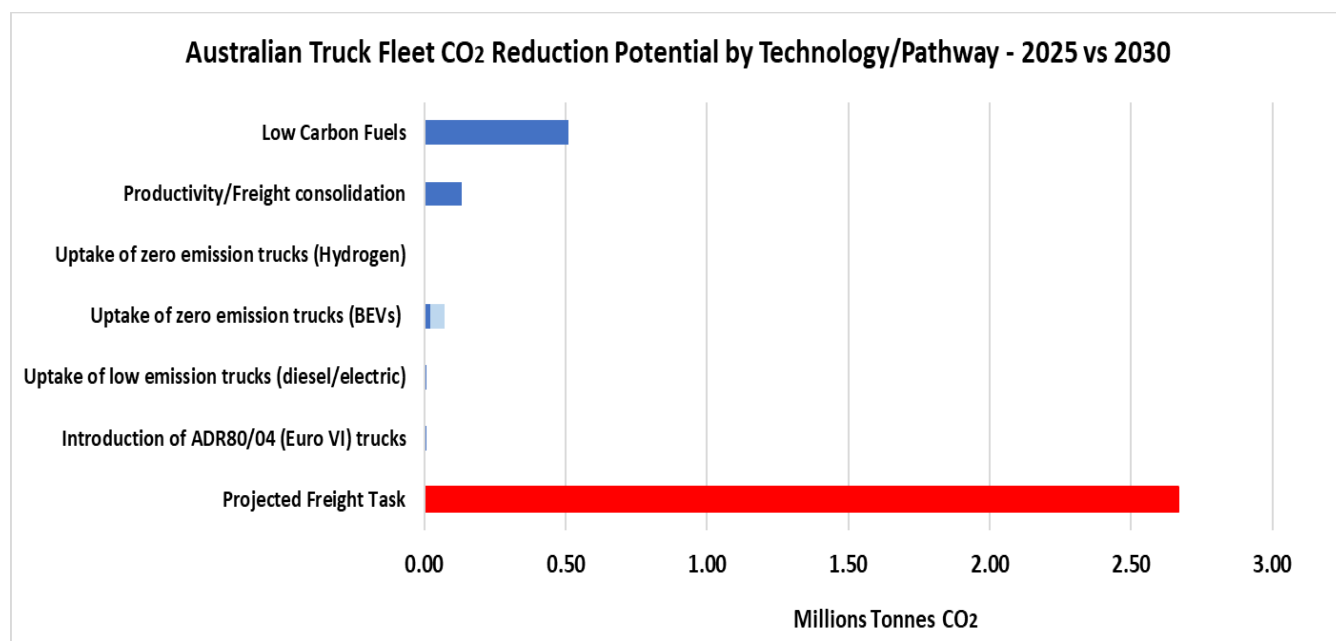


Figure 6: Australia Truck Fleet CO₂ Reduction Potential by Technology/Pathway – 2025 vs 2030

Road Freight Task Growth:

Australia's truck fleet grows in proportion to growth in the national road freight task. The CO₂ emission growth, by 2030 over the 2025 level, due to the predicted road freight task growth is shown by the **RED bar** in Figure 6. This amounts to an increase of 2.667 Mt CO₂ over this period.

Low Carbon Liquid Fuels:

The principal benefit of utilizing low carbon liquid fuels is that the wholesale compatibility of these fuels with conventional internal combustion engine technology means that they can be used to deliver emissions reduction across the entire fleet – that is, old and new trucks – as opposed to relying on the gradual market adoption of new low, or zero, carbon drivetrain technology trucks.

These fuels, specifically renewable diesel and synthetic diesel, have the potential to lower GHG emissions by 80% (some fuel suppliers have international accreditation of 93% carbon abatement for their current renewable diesel), when compared with emissions generated by conventional mineral diesel consumed in the national truck fleet.

Unfortunately, the near-term market take-up of these fuels is constrained by both limited national supply in 2025 (i.e. no Australian manufacturing of renewable diesel and limited, small import volumes) and a significant cost premium relative to conventional diesel for these imported renewable diesel supplies. Early market experience suggests that 'neat' renewable diesel is 1.5 times more expensive than conventional diesel, with synthetic diesel being 2.5 times more expensive.

A realistic strategy for delivery of an emissions reduction by 2030 is the market utilization of renewable diesel blends such as R10 (10% renewable diesel) and R20 (20% renewable diesel). These blends are estimated to add between 12c (R10) and 24c (R20) per litre of diesel consumption. This could be potentially less, if a domestic renewable diesel industry is developed, as Australia is rich in suitable feedstocks for renewable diesel production. Currently much of this feedstock is exported to Europe and the USA for their domestic production of renewable diesel and sustainable aviation fuel (SAF). Only for Australian diesel and aviation fuel users to import these low carbon fuels at a cost premium and with decreased carbon abatement due to the GHG emissions produced in shipping these fuels around the world.

TIC has modelled the 30% take-up rate of an R10 diesel, with 80% GHG abatement by 2030. The resultant potential CO₂ reductions of 0.51 Mt CO₂ are shown in Figure 6 as the **DARK BLUE bar** titled *Low Carbon Fuels*. A higher take-up rate and/or a higher renewable diesel blend percentage and/or a greater GHG abatement fuel, would all increase the potential CO₂ reductions that could be achieved, over those modelled in Figure 6, by the uptake of low carbon fuels in the Australian truck fleet.

Productivity/Freight Consolidation:

It follows that increasing the average volume and/or mass of freight moved per vehicle provides an opportunity to reduce growth in the national truck fleet – and reduce GHG emissions. High productivity vehicles provide an opportunity to move road freight, with greater levels of energy efficiency, hence overall reducing CO₂ emissions.

Given that articulated vehicles accounted for 58% of all GHG emissions produced by the national truck fleet and are projected to generate 60% of these emissions by 2030, strategies that improve the energy productivity of this truck segment present significant potential to reduce GHG emission from the national truck fleet.

By comparison with the typical average load transported by a semi-trailer (i.e. 32.5t payload), a prime mover operating with a B-Double combination delivers a 48% increase in payload for a 10% increase in average annual fuel consumption. Similarly, a B-triple delivers an average 77% increase in payload for a 15% increase in average annual fuel consumption.

Considering these combinations on a GHG emissions basis, replacement of a semi-trailer with a B-Double delivers 29% in energy productivity in annual emissions from an articulated vehicle and replacement with a B-triple delivers a 35% reduction in annual GHG emissions (refer Figure 7)

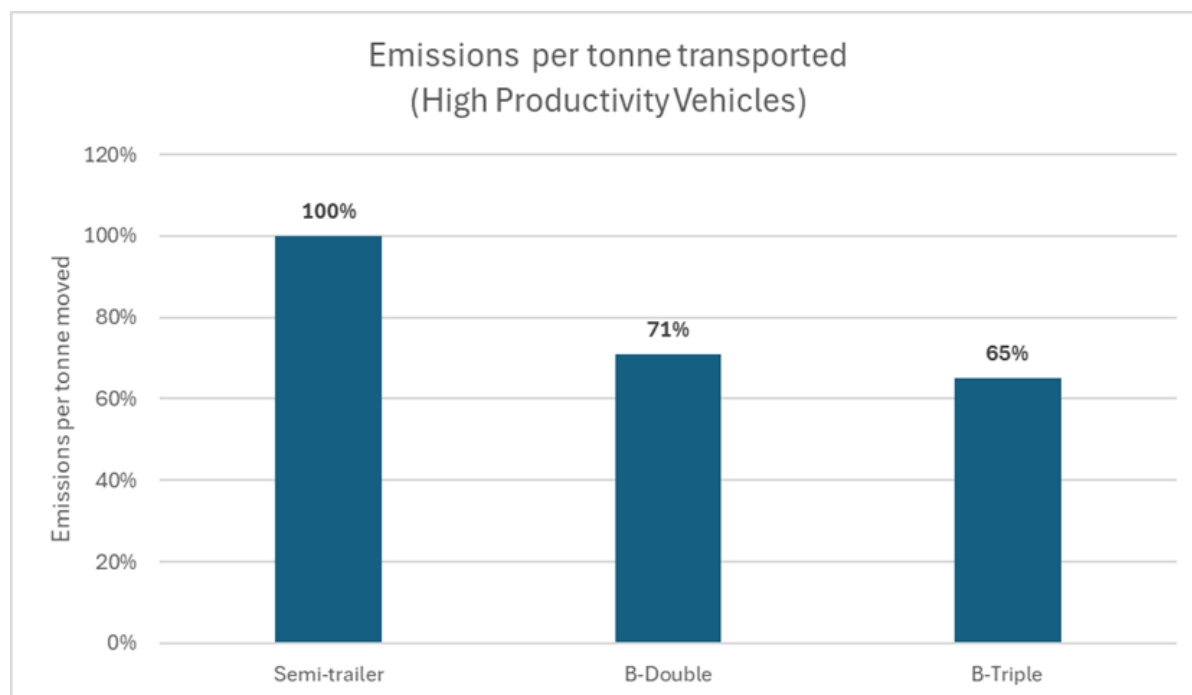


Figure 7: Increased utilization of high productivity vehicles within the articulated truck segment offers significant potential for emissions reduction to 2030 and beyond.

Over 50% of the Australian articulated truck fleet are semi-trailers. TIC has modelled a simple scenario that assumes 40% of the current semi-trailer fleet are transitioned to B-Doubles. The resultant CO₂ reductions of 0.13 Mt CO₂ are shown in Figure 6 as the **DARK BLUE** bar titled *Productivity/Freight Consolidation*. It can be seen that this pathway potentially provides the second largest GHG abatement opportunity for the road freight sector by 2030. Unlike an Australian low carbon liquid fuel industry, that will take time (likely +5 years) to develop and start delivering the required volumes of fuel required to make significant CO₂ reductions, productivity/freight consolidation could begin today. The potential for productivity/freight consolidation GHG reductions goes beyond that model by TIC and shown in Figure 6.

Uptake of zero emission trucks (BEVs):

The Consultation Roadmap suggests that Battery Electric (BEV) and Hydrogen Fuel Cell trucks (discussed separately below) will be the dominant technology/pathway for reduction of GHG emissions from the national heavy vehicle fleet, with Low Carbon Fuels to play a minor, supporting, role where such BEV and hydrogen technologies are not feasible. TICs analysis and modelling does not support these assumptions.

The details above clearly show that Low Carbon Fuels have the most potential to reduce CO₂ emissions from the heavy vehicle sector at 2030, with productivity/freight consolidation from higher productivity vehicles showing the best potential abatement opportunity for the sector between 2025 and 2030, with significant potential extending beyond 2030.

The current state of Battery Electric drivetrain technology is unsuitable and/or not commercially viable for heavy vehicle applications other than the operation of trucks deployed in city/metro/urban delivery applications. The diesel vehicles currently performing this urban task make up around 18% of Australia's truck GHG emissions.

While Battery Electric drivetrain technology is expected to improve, no significant advances are anticipated before 2030, more likely 2035 for the battery technology required to make significant inroads into diesel truck operational equivalence. Even then, long distance, high GCM, transport tasks will be unlikely for BEV trucks.

Further, the very limited charging infrastructure for BEV trucks (as opposed to BEV car charging infrastructure) is a significant obstacle for the greater take-up of BEV trucks in sufficient numbers to support this technology pathway as being the front running GHG abatement technology by 2030, or even 2035.

TICs modelling of the take-up and abatement potential of BEV trucks is shown in Figure 6 under the heading, *Uptake of zero emission trucks (BEVs)*. The CO₂ abatement potential bar has been split into two parts, the **DARK BLUE bar** portion depicts a more modest take up of new BEV trucks between 2025 and 2030. This rate is based on incremental sales increases year on year for BEV trucks between 2025 and 2030. This would be best likened to a Business As Usual (BAU) case and modelling shows a potential abatement of 0.022 Mt CO₂. While the combined **DARK BLUE bar** portion and **LIGHT BLUE bar** portion depicts a more ambitious take up of BEV trucks, that being 20% of new Light Rigid sales plus 5% of new Heavy Rigid truck sales to be BEV by 2030.

For the GHG abatement potential of 0.072 Mt CO₂ shown by the combined **DARK BLUE bar** plus the **LIGHT BLUE bar** to be realised, one in four new truck sales will need to be BEV truck by 2030 and would result in excess of 20,000 zero emissions trucks on Australian roads by the end of this decade. This will require both financial incentives (zero emission vehicle rebates, tax offsets, registration charges, etc), regulatory incentives (additional axle mass to off-set the payload loss of heavier BEV trucks, etc), together with a significant truck specific charging infrastructure rollout.

More Efficient Diesel Drivelines:

The reduction in CO₂ emissions from the introduction of ADR80/04 (Euro VI) from November 2024 and the uptake of new diesel/electric hybrid trucks, based on BAU truck sales, shows only a modest GHG abatement from these technologies. Increased uptake of these trucks would be required to realise greater abatement benefits across the truck fleet. This greater than BAU uptake could be fostered by incentives (financial, tax, etc), or disincentives (emission zones limiting access to older trucks and encouraging the uptake of new cleaner and greener trucks). The abatement potential of these technologies by 2030 (in combination 0.012 Mt CO₂) is shown in Figure 6 by the **DARK BLUE bars** titled, *Uptake of low emission trucks (diesel/electric) and Introduction of ADR80/04 (Euro VI) trucks*.

Zero Emission Hydrogen Trucks:

The GHG abatement potential of hydrogen powered trucks (both fuel cell and ICE), between 2025 and 2030 was found to be very small based on TICs modelling. The availability of green hydrogen and its high transaction price, limited truck model availability, high up-front cost of a hydrogen powered trucks and a lack of refuelling infrastructure, were the main contributing factors in TICs analysis. This concluded that hydrogen powered trucks are likely to only be trialled in Australia between 2025 and 2030, with no commercially viable operations likely in the foreseeable future. The GHG reductions by 2030 from this technology were too small to appear in Figure 6, nonetheless, the technology is listed under the heading, *Uptake of zero emission trucks (Hydrogen)*.

It can be seen from Figure 6, that the realistic adoption/take-up of CO₂ abatement technologies/pathways between 2025 and 2030 will not counter the predicted emissions increase from the heavy vehicle road freight sector. At best only one third of these new CO₂ emissions will likely be off-set. Highlighting just why the road freight sector is such a difficult sector to abate.

Heavy vehicle energy equivalent costs for conventional diesel engines versus low carbon drivetrains:
 The availability of new low carbon drivetrains is growing at an OEM level (more truck models available with low and zero emission drivelines as well as the growing availability of low carbon fuels for use in conventional diesel engines). However, all these alternative carbon abatement technologies come at a cost both in terms of the technology used in the truck, but also in terms of infrastructure costs (charging, refuelling, etc) and/or the “fuel” cost (electricity, renewable diesel and hydrogen).

The Truck Industry Council last year commissioned a study that sought to compare the energy costs of operating low carbon drivetrains of various types versus conventional diesel drivetrains (Reference: TIC Energy Switching in the Australian Truck Industry, November 2023).

Analysis of the findings of this work revealed that the energy switching costs (i.e. excluding any capital cost premium for the vehicle) are likely to be a significant barrier to the market adoption of low carbon drivetrain trucks in the deeply cost-sensitive road freight sector for at least a decade. A review of this work gives rise to the following observations:

- The energy switching costs associated with a switch to lower carbon diesel fuel blends are between 10% and 30% higher than diesel operation.
- The costs of switching to BEV operation varies from between 25% to 65% higher (for ‘trickle charge’ operation) and between 70% and 125% higher (for fast-charge operation) than diesel operation.
- The costs of switching to a FCEV are typically 50% higher than diesel operation for all segments of the national truck fleet. The annual energy cost of a FCEV is higher than the trickle charge operation of BEV light rigid trucks, but lower than trickle charge operation for both heavy rigid trucks and prime movers. Compared with fast-charge operation, the energy cost of Hydrogen FCEV operation is between 20% lower (for light rigid trucks) and 75% lower (for prime movers) than BEV operation.
- The energy switching costs for all energy sources analysed – and across all four fleet segments (refer to Figure 8 through Figure 11 below) – are likely to be a material barrier to market adoption over the next decade. This assessment is made even before consideration of any capital cost premium associated with the purchase of a new BEV or FCEV truck is applied.

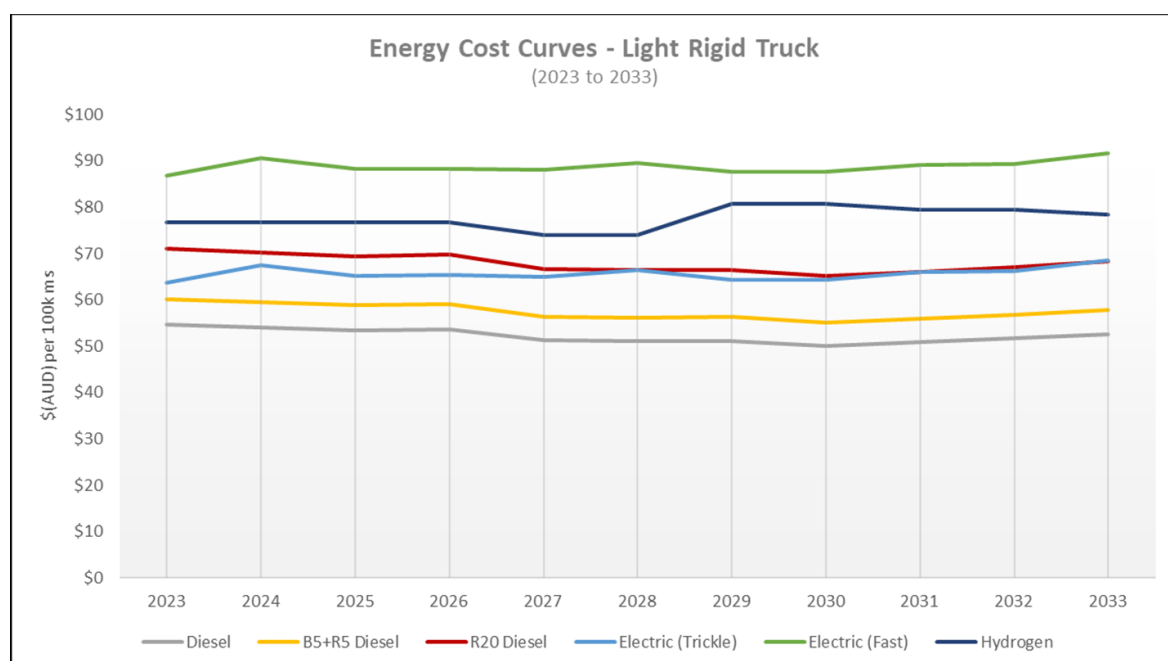


Figure 8. Energy Cost Curves for Light Rigid Trucks

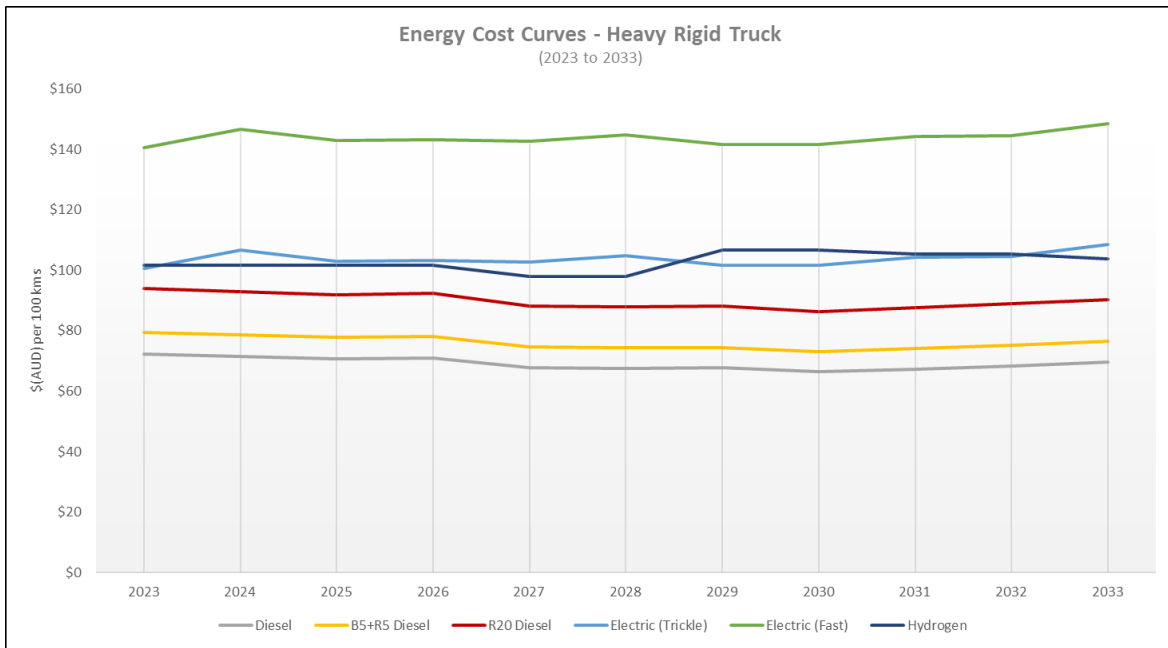


Figure 9. Energy Cost Curves for Heavy Rigid Trucks

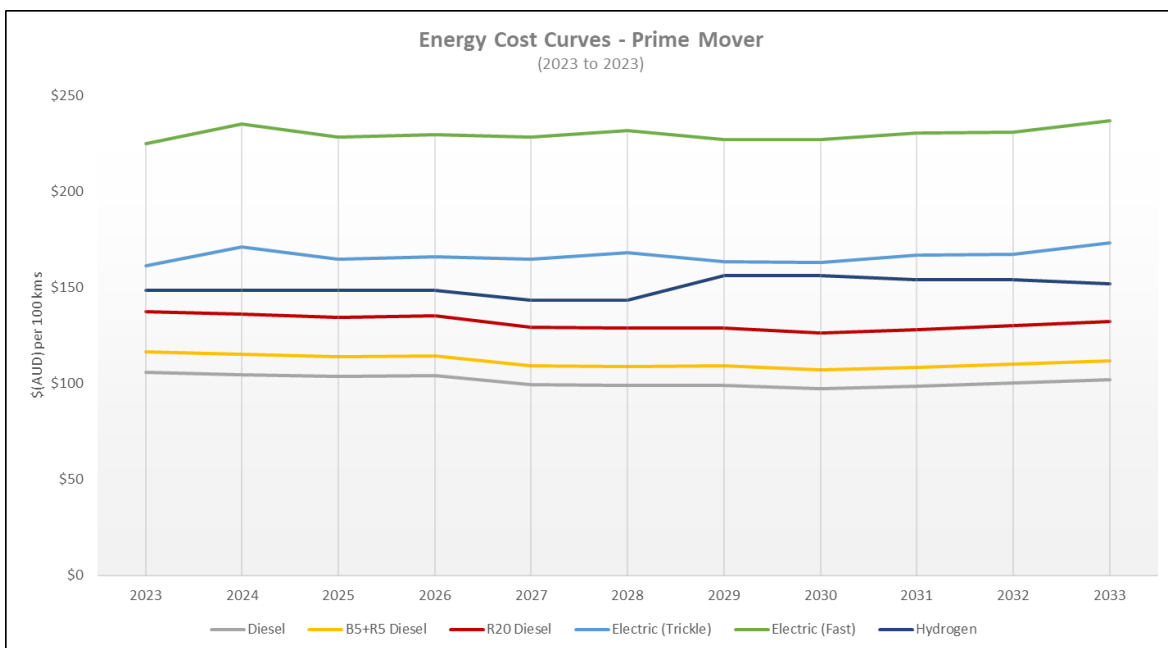


Figure 10. Energy Cost Curves for Prime Movers

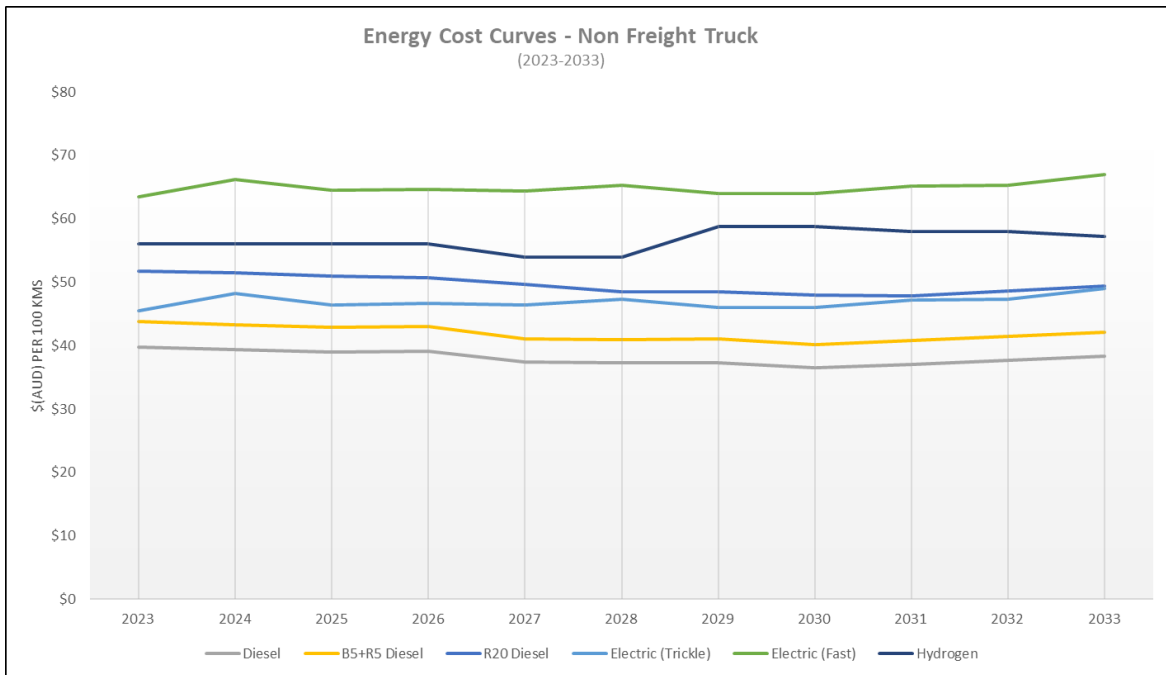


Figure 11. Energy Cost Curves for Non-Freight Trucks

Given the above analysis, it is obvious that there will be a need to explore mechanisms for incentivising the market adoption of, low carbon liquid fuels, low and zero carbon drivetrains within the Australian truck fleet, as well as offsetting the very high infrastructure costs associated with these technologies. Such incentives will be required to offset the increased operating cost of these trucks compared to the incumbent diesel engine technology.

The following section in this submission includes a number of proposed policy and regulatory levers that could be deployed by government to incentivise the uptake of low and zero emission truck technologies.

Decarbonisation Pathways/Technologies Discussion

A. Modernisation of the Australian Truck Fleet - Accelerated adoption of more fuel-efficient trucks

Australia currently has one of the oldest truck fleets in the world which by its nature presents Government with a significant challenge if it is to achieve net zero emissions by 2050. The average age of Australia's truck fleet is 14.8 years for vehicles above 4.5 tonne. This compares with Austria (6.6 years), Denmark (7.5 years), United States (6.7 years) and Canada (9.2 years).

TIC calls for a dedicated Government policy to accelerate the modernisation of the Australian Truck Fleet to reduce carbon and noxious emissions. In doing so, it will bring into the fleet much safer and more productive vehicles. Government failing to act on this policy initiative will also directly affect the nation's ability to address other key societal problems such as improving road safety and health outcomes, and enabling the land freight distribution channel to contribute to the development of a stronger economy.

TIC calls upon the Government to make permanent the previously successfully Full Expensing measure where eligible businesses were able to claim a 100 percent deduction for the cost of a truck or trailer asset in the year it is first used or installed ready for use. Such an initiative will encourage operators to modernise their fleets, accelerating the adoption of new Low and Zero Emission Trucks

as well as new ADR 80/04 (Euro VI and equivalents) diesel powered trucks which are up to ten (10) percent more fuel-efficient trucks than earlier models.

B. Maintaining Truck Productivity - Additional axle mass for low and zero emission trucks and diesel trucks above 15t GVM (ADR 80/04 Euro VI and equivalents only).

Low and zero emission trucks are disadvantage when compared to diesel trucks as these vehicles are heavier having higher TARE weight due to the need for batteries. This reduces their payload capacity and hence productivity and profitability compared to a similar sized internal combustion truck. The purchase of a truck by an operator is a business decision and a loss of productivity will mean that the operator will not purchase a low or zero emission vehicle when the vehicle's load carrying capacity is less than the conventional diesel truck.

TIC calls upon Federal and State Governments to work towards uniformity agreeing and implementing measures, across all jurisdictions, that offset the operator mass losses of a new low and zero emission truck by allowing higher axle masses as compensation. Recent decisions made by State Governments regarding increased axle masses for such vehicles, while welcomed, are not coordinated leaving the country with different rules for different states. The shadow of different rail gauges looms large in this debate as it appears States are again creating different regimes much to the nation's economic disadvantage.

C. Creation of an Australian low carbon liquid fuel industry (LCLF production)

To maximise the immediate potential of LCLFs so as to reduce carbon emissions from the existing truck fleet, it is crucial for government to reestablish the existing Bio-diesel production capacity in Australia. Further fully leveraging HEFA's technological and commercial readiness for the production of renewable diesel, by means of a capital and production financial incentive program. At the same time, it is essential to support and recognise in policy design emerging technologies such as Fischer-Tropsch¹, which utilises bio/agricultural wastes and residues to ensure continued future LCLF production growth. Therefore, a combination of mechanisms that support established pathways, as well as policies that specifically de-risk emerging technology, would be effective to maximising domestic production capabilities, in the short, mid and long-term.

Government needs to finalise the draft Paraffinic Diesel (Renewable Diesel) Standard, ensuring that the standard aligns with the equivalent European fuel standard to ensure trouble free operability and reliability of the existing and new diesel truck fleet.

Government to expand of the Guarantee of Origin Scheme to include LCLFs. The sustainability criteria for the inclusion of LCLF in the Guarantee of Origin Scheme should substantially align with existing international models while also being adapted to suit Australia's specific context/parameters, support local feedstocks and importantly acknowledge the unique efficiencies and characteristics of the Australia agricultural sector (eg: land use parameters MUST factor in Australia's land mass, land use and sparse population, a very different scenario to the land use issues pertaining to Europe and much of Asia).

Government to implement blending mandates for Bio-diesel, Renewable Diesel and SAF to be introduced concurrently on all three LCLFs and at a point in the fuel supply chain no later than the fuel wholesaler. Mandates should be legally binding on wholesale fuel suppliers. Non-binding mandates and/or mandates applied at the fuel retail point have failed in Australia previously. Mandated volumes of Bio-diesel, Renewable Diesel and SAF must be accompanied by a fuel carbon trading scheme, or a book and claim scheme allowing the specific LCLF to be blended close to its

¹ A chemical reaction process that produces synthetic fuels and lubricating oils. The carbon monoxide and hydrogen required for the process can be derived from biomass feedstocks.

production (or import) source. Hence ensuring that the carbon abatement potential of the fuel is maximised and not reduced by needlessly transporting the LCLF across Australia to ensure an even distribution of the blended fuel across the nation.

TIC calls upon government to introduce measures that will achieve cost effective, high quality and consistent, LCLF/mineral diesel blends to support blend mandates. The volume blending system used in Europe could be introduced in Australia, however this would require the introduction of an Alternative Mineral Diesel Standard aligned with European diesel fuel standard EN590. For more details regarding this measure and a more comprehensive explanation of TICs LCLF proposals, please refer to TICs submission to the: *Department Climate Change, Energy, Environment and Water's, Low Carbon Liquid Fuels Consultation Paper – June 2024.*

Government has an important role to play in steering the development of the industry to develop technologies and facilities that are most suitable for the long-term development of an LCLF industry in Australia, particularly beyond 2030/2035.

D. Positive Rebate and Tax Incentives

TIC calls upon National Cabinet to implement green vehicle rebates, reducing uniformly federal and state taxes (registration charges and stamp duty) for low and zero emission trucks and ADR 80/04 (Euro VI and Equivalent) diesel powered trucks.

E. Improving Truck Energy Productivity – Removing Regulatory Barriers

There is no one specific “silver bullet” that can be used to reduce Australia’s road freight CO₂ emissions from the existing diesel powered fleet, but rather a series of methods will need to be employed, that when combined will result in reduced CO₂ emissions for a given freight task. Improving the road freight sector’s energy productivity thus reducing CO₂ emissions by increasing the efficiency of how freight is moved needs to become a core policy focus by the Federal and State Governments.

TIC has identified potential strategies for the realisation of energy productivity improvements in the national truck fleet. These are:

- A. Introduction of B-triples, or A-doubles, for line haulage (ADR 80/04 Euro VI trucks and equivalents with advanced safety features only).
- B. Increased use of B-double combinations for line-haul movement.
- C. Performance Based Standards (PBS), (Excluding B-triples and A-doubles).

TIC calls for National Cabinet to:

- Remove regulatory and infrastructure barriers preventing the uptake of Higher Productivity Vehicles, for example, B-triple, A-double and PBS in turn, using these incentives to leverage the fitting of specific vehicle advanced safety features.
- To incentivize the transition from semi-trailer to B-double combinations, by reducing registration charges for B-double vehicles with advanced safety features.

F. Low Emission Zones

State and Territory Governments should designate low emission zones defined by road/tunnel/port infrastructure or geographical parameters preferencing low and zero emission heavy vehicles and ADR 80/04 heavy vehicles with reduced government charges such as road tolls. Alternatively, increased toll charges and/or emission zone fees for pre-2011 vehicles with poor emission

performance. Such charges should be in-line with the pollutants emitted by these higher polluting vehicles.

G. Road User Charging (RUC)

The current model of collecting fuel excise on the purchase of diesel and petrol will not be suited to an economy transitioning towards a future where low carbon alternatives will power the nation's light and heavy vehicle fleet. Operators purchasing a zero-emission truck simply have no idea of the RUC charges that may be applied to a ZEV in the future. With no current mechanism to capture anything but registration funding from low and zero emission trucks, the majority of RUC funding will diminish as we transition the heavy vehicle road freight sector to a low/zero carbon future. Noting the recent decision by National Cabinet to review State revenue sources in light of the High Court decision in *Vanderstock & Anor v State of Victoria* TIC calls upon National Cabinet to review the Road User Charging (RUC) scheme for heavy vehicles broadening its scope beyond the current Pay As You GO (PAYGO) scheme.

TIC believes that such a review should be extensive and holistic, given the current RUC mechanism, that derives the majority of its funding from diesel excise, is fundamentally flawed in light of a global movement to alternatively fuelled trucks, most likely to be powered by electricity and hydrogen. TIC believes the current RUC arrangements could not take Australian road transport deep into the twenty first century and that a significant overhaul of the current charging arrangements is urgently required. TIC calls upon National Cabinet to implement a RUC scheme that ensures that all vehicles pay proportionally for the damage, or lack thereof, they contribute to our roads, the safety they afford all road users, the public health outcomes they generate and the carbon emissions that they produce. TIC believes this to be a fairer more equitable scheme paving the way to a safer truck fleet, one that leads to better health outcomes for all Australians, produces ongoing reductions in CO₂ emissions from the road freight sector and provides operators who embrace low and zero emission technology with financial incentives whilst using these new vehicles in their daily businesses.

H. The Urgent Need for Infrastructure

The adoption of zero emission vehicles will be heavily tied to appropriate infrastructure being built. Moreover, hand in hand with the infrastructure itself, will be the location of such infrastructure. The performance of current Zero Emission Vehicles is limited by a number of technological issues (and thus applications). TIC believes that the following key infrastructure considerations need to be addressed.

Battery Electric Vehicles

- Provision of public electric vehicle infrastructure that is suitable for use by heavy vehicles. This generally requires drive through configuration and ultra high-capacity DC charging stations (as a minimum 100kW).
- Improve national electrical grid infrastructure to enable operators to install required charging infrastructure at their base. TIC is aware of several instances where operators were keen to trial a small number of battery electric trucks, but were ultimately prevented from doing so due to the electrical grid provider's inability to upgrade electrical supply at their base. This was either as a result of physical inability or excessive cost. The ability to re-charge at base is critical at this early stage for the early adoption of BEV (trucks), given limited public charging infrastructure and the fact that current BEV technology is highly suited to return to base type operations.
- Location of public charging stations should favour metropolitan areas in the short term and then moving on to key major freight routes.

Hydrogen Fuelled vehicles

- Fast tracking of infrastructure to facilitate the manufacture and distribution of green hydrogen, or in the medium term, low emission methods to manufacture hydrogen such as blue hydrogen or white hydrogen. This will assist in improving supply and in turn placing downward pressure on the cost of hydrogen.
- Increase the number of fast refill hydrogen stations with priority locations around metropolitan freight transport hubs and along major transport corridors.
- Consider short term financial incentives to reduce the cost of hydrogen so that it is competitive with diesel per tonne km, until production costs drop due to increased availability of hydrogen.

1. BEV powered trailers (eTrailers)

TIC acknowledges the potential abatement potential of eTrailers. An eTrailer can take a number of forms, however the version that TIC is advocating for is a trailer that is fitted with an electric drive axle and an onboard battery that is capable of self-propelling the trailer, or at least partially propelling the trailer. The technology deployed in this type of eTrailer is essentially the same as that used in a battery electric truck, an electric motor powered by an onboard battery, however, unlike battery electric trucks, eTrailers currently very much remains in an experimental/trial phase. There are a number of reasons for this, including:

- Lack of Australian and international regulations defining what an eTrailer is, how it could/should operate, what level of connectivity is required between the truck and eTrailer (the truck must communicate to the eTrailer to tell it to start and stop and when in motion, how fast the eTrailer should be travelling, etc).
- There are no international truck/trailer communication protocols (the Australian road freight industry cannot afford to have proprietary control systems. A nationally (preferably internationally) uniform communication protocol needs to be developed to ensure truck/eTrailer operability across the Australian truck/trailer fleet.
- With the required truck/eTrailer communication come the risk of cyber attacks, hence security protocols/regulations must be developed.
- Safety regulations must be applied to eTrailer battery and electrical systems to ensure safe operation.
- What charging infrastructure would need to be developed and deployed to support eTrailers. For example, it would not be practical for a BEV prime mover towing two eTrailers (an electric B-Double) to pull up and only be able to charge the BEV prime mover, then move forward to charge the first trailer, then move further forward to charge the second trailer. This charging operation would be completed in three separate charges. If each charge took one hour, the electric B-Double would take three hours to charge. This would be impractical.
- eTrailers will be by design, quite a lot heavier than a conventional trailer (due to the battery and electric drive motor/system), hence an eTrailer will not be able to carry the same payload as a conventional trailer, unless additional axle mass concessions are granted/legislated for e Trailers.
- Our current Australian road rules do not have a category for powered trailers, hence eTrailers are not legal on Australian roads.
- The above should not be taken as an exhaustive list of the unknowns/drawbacks of eTrailers at present, there are likely to be a number of other drawbacks.

All of the above are significant obstacles that must be overcome before eTrailers become a practical reality internationally and potentially in Australia. TIC believes that due to the number of regulatory issues/challenges that currently beset eTrailers, their viable deployment/widespread use before 2030 is unlikely. However, there are undoubtedly potential benefits for eTrailers and TIC believes all

operational issues should be explored with on-road eTrailer trials that are supported by State and Federal Governments in conjunction with the NHVR and the NTC.

J. Reinstatement of the ABS Motor Vehicle Census and ABS Motor Vehicle Use Survey.

TIC calls for the reinstatement of the ABS Motor Vehicle Census and ABS Motor Vehicle Use Survey.

Two key data sets previously prepared yearly by the Australian Bureau of Statistics the ABS Motor Vehicle Census and the ABS Motor Vehicle Survey are no longer available, with the last data issued in 2020.

This data was critical in determining key metrics, such as vehicle attrition amongst others. It was widely used by government agencies and industry to assess important trends, such as monitoring the age of the fleet in each segment to understand the progression of safety and emissions technology. It formed a key element in informing policy decisions by all levels of government.

The ABS ceasing production of this data has meant that both industry and regulators have needed to expend considerable effort to obtain similar data, a significant portion of which cannot be obtained currently without the coordination of state jurisdictions. Therefore, those who had used the data previously have been put in the unenviable position of having to estimate key metrics since 2020.

TIC points out two data set examples that are no longer available, previously provided (or derived) from ABS data but now not provided by the replacement data from BITRE.

The first example is that BITRE data cannot be used to derive vehicle attrition from the fleet. The attrition rate gives a very good estimate of the number of vehicles that are no longer used. Further, from the ABS Motor Vehicle Census data, an attrition rate by emission standards and by vehicle segment could be obtained. In the context of trying to determine CO₂ emissions of the fleet, the attrition rate by emission standard will assist in accounting for the different levels of emissions between standards. Further, segmentation by vehicle type will yield the vehicle segment with the most reduction in emissions. These vehicles, no longer in the fleet, will then be considered to have zero emissions and so must be counted towards the overall emission reduction figures.

The second example is that from the ABS Motor Vehicle Use report, fleet fuel consumption was provided. This was segmented by vehicle type and urban/regional split. This now critical fuel usage data *is not provided by BITRE* and thus industry and government has not been able to calculate fleet CO₂ emissions accurately since 2020.

A significantly more granular vehicle fleet data set will be required going forward. TIC believes that due to current limitations in ZEV technology, these vehicles will, in the short to medium term, only be viable in specific applications and operational circumstances. It is therefore critical that the collection and distribution of previously available ABS data sets, that cannot be obtained from BITRE data, be reinstated. These important vehicle fleet metrics will be needed to derive accurate emission metrics of the vehicle fleet, informing future policy.

Assessment Tools for Operators

TIC believes that in order for the Government to facilitate a reduction in carbon emissions, simple tools need to be developed to assist truck operators to estimate their emissions.

TIC envisages a tool where an operator can enter their fleet details, along with some basic operational data, such as yearly distance travelled, fuel consumed. This would yield emissions estimates and allow an operator to monitor emission trends in their fleet. It would also allow operators to readily promote to prospective and existing customers their commitment to reducing emissions, through a consistent methodology used across industry.

K. Social expectations of freight services driving up CO2 emissions – social change is required

Zero emissions cannot be achieved through technology only, society, in general, is part of the solution. To achieve zero emissions will require behavioural change: operators making the decision to renew old trucks; operators changing to low carbon fuels; consumers consolidating orders; and Government introducing meaningful incentives that encourage behaviour change. TIC calls upon Government to invest in a public awareness campaign with the objective being to change current undesired behaviours in favour of those desired behaviours that pursue zero emissions.

Decarbonisation Pathways/Technologies Timeline Recommendations

The Truck Industry Council recommends that governments develop policy settings to foster the below decarbonisation pathways/technologies, shown in order of suggested practical implementation and abatement potential.

2025 to 2030

1. Encourage/incentivise the increased use of high productivity rigid truck and prime mover combinations – Moving more freight with less trucks
2. Use of low carbon liquid fuels (renewable diesel) for the entire existing diesel truck fleet. This would be best achieved by the development of an Australian low carbon liquid fuel industry (LCLF production)
3. Encourage/incentivise the take-up of Battery Electric Vehicles (BEV) for Light, Medium and Heavy trucks and vans operating in city/urban/metro areas
4. Encourage/incentivise the take-up of diesel/electric hybrid Light, Medium and Heavy trucks and vans operating across Australia
5. Support evaluation trials for eTrailers

The above should be supported by policies that seek the modernisation of the Australian Truck Fleet (Discussion A above), that is, the replacement of older diesel powered trucks in city/urban/metro areas. For example, TIC believes that State Governments should action policy that leads to the phased introduction of low emission zones in major capital cities (Discussion F above).

2030 to 2035

6. Continuation of the above measures, however with further restricted access to diesel truck operation in city/urban/metro areas (emission zones extended in area of coverage and in severity, in order to further drive the uptake of zero emission vehicles in these areas of operation)
7. The broader use/adoption of eTrailers

Beyond 2035

8. Continuation of the above measures. Utilisation of hydrogen fuel cell electric vehicles (FCEVs) and/or compulsory utilisation of near-zero emission synthetic diesel for inter-regional and long-distance road freight operations

Supporting the timeline recommendations is the following summary of TIC's recommendations:

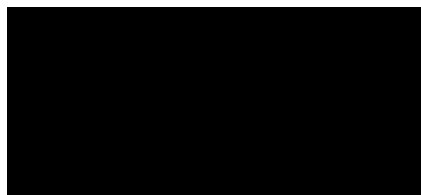
- TIC calls upon the Government to make permanent the previously successful Full Expensing measure where eligible businesses were able to claim a 100 percent deduction for the cost of a new truck asset in the year it is first used or installed ready for use.
- TIC calls upon Federal and State Governments to work towards uniformity agreeing and implementing measures, across all jurisdictions, that offset the operator's payload loss of a new low and zero emission truck, by allowing higher axle masses to restore parity with similar size internal combustion vehicles.

- TIC calls upon the Government to introduce capital and production financial incentives to foster the development of an Australian low carbon liquid fuel industry production capacity.
- TIC calls upon the Government to finalize the draft Paraffinic Diesel (Renewable Diesel) Standard.
- TIC calls upon the Government to expand of the Guarantee of Origin Scheme to include LCLFs.
- TIC calls upon the Government to implement blending mandates for Bio-diesel, Renewable Diesel and SAF to be introduced concurrently on all three LCLFs and at a point in the fuel supply chain no later than the fuel wholesaler.
- TIC calls upon the Government to introduce measures that will achieve cost effective, high quality and consistent, LCLF/mineral diesel blends to support blend mandates. TIC proposes a volume blending regulation/system similar to that deployed in Europe.
- TIC calls upon National Cabinet to implement uniformly measures, across all jurisdictions, that offset the operator mass losses of a new low and zero emission truck by allowing higher axle masses as compensation; green vehicle rebate; and reducing federal and state taxes (registration charges and stamp duty) for low and zero emission trucks as well as for ADR 80/04 (Euro VI and Equivalent) diesel powered trucks.
- TIC calls upon National Cabinet to: Remove regulatory and infrastructure barriers preventing the uptake of Higher Productivity Vehicles, for example, B-triple, A-double and PBS in combination with the uptake of specific vehicle advanced safety features; and to incentivize the transition from semi-trailer to B-double combinations, by reducing registration charges for B-double vehicles with advanced safety features.
- TIC calls upon State Governments to introduce Low Emission Zones.
- TIC calls upon National Cabinet to implement a Road User Scheme (RUC) scheme that ensures that all vehicles pay proportionally for the damage, or lack thereof, they contribute to our roads, the safety they afford all road users, the public health outcomes they generate and the carbon emissions that they produce.
- TIC believes Government has a fundamental role in stimulating the provision of key infrastructure necessary for the transition and uptake of low and zero emission heavy vehicles, for example, the provision of public electric vehicle infrastructure that is suitable for use by heavy vehicles, improve the national electrical grid infrastructure capacity and fast-tracking infrastructure to facilitate the manufacture and distribution of green hydrogen.
- TIC calls for Government to reinstate and fund appropriately the ABS Motor Vehicle Census and ABS Motor Vehicle Use Survey.
- TIC calls upon the Government to establish a simple assessment tool to assist truck operators to estimate and reduce their emissions.
- TIC calls upon the State and Federal Governments to support evaluation trials for eTrailers.
- TIC calls upon Government to invest in a public awareness campaign with the objective being to change current undesired consumer and operator behaviours that result in more carbon emissions in favour of desired behaviours that pursue the objective of reduced emissions.

On behalf of the Truck Industry Council, I trust that you find TIC's submission of interest and that the issues and recommendations that have been raised will be considered in the development of policy and regulatory settings to support the decarbonisation of the heavy vehicle road freight sector in Australia.

Please contact the undersigned, on [REDACTED] for any questions about this submission.

Yours faithfully,



Anthony J McMullan *PhD*
Chief Executive Officer

Truck Industry Council Member Brands:

Truck OEMs:

DAF Trucks (Diesel)
Dennis Eagle Trucks (Diesel)
Foton Mobility Trucks and Vans (BEV trucks only)
Fuso Trucks and Busses (Diesel and BEV)
Freightliner Trucks (Diesel)
Hino Trucks (Diesel and Diesel/Electric hybrid)
Isuzu Trucks (Diesel)
Iveco Trucks, Busses and Vans (Diesel and BEV)
Kenworth Trucks (Diesel)
Mack Trucks (Diesel)
MAN Trucks and Busses (Diesel)
Mercedes-Benz Trucks (Diesel and BEV)
Mercedes-Benz Vans (Diesel and BEV)
Scania Trucks and Busses (Diesel and BEV)
UD Trucks (Diesel)
Volvo Trucks and Busses (Diesel and BEV)
Western Star Trucks (Diesel)

Engine and major system suppliers:

Allison Transmissions Australia
Eaton Transmissions Australia
Cummins Engines
Detroit Engines



24th July, 2024

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090, Canberra, ACT, 2601

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Web: dceew.gov.au

Submissions: lclfconsultation@infrastructure.gov.au

Subject: The Truck Industry Council's response to the Department Climate Change, Energy, Environment and Water's, *Low Carbon Liquid Fuels Consultation Paper – June 2024*

The Truck Industry Council (TIC) is the peak industry body representing manufacturers and distributors of heavy commercial vehicles (that is, with Gross Vehicle Mass above 3.5t) or “trucks” in Australia. TIC members are responsible for producing or importing and distributing 17 brands of truck for the Australian market, totalling almost 48,000 trucks in 2023. In 2023 TIC members supplied to market over ninety-eight (99) percent of all new on-highway trucks above 4.5 tonne Gross Vehicle Mass (GVM) sold in Australia.

Further, TIC also comprises of two dedicated engine manufacture members and two dedicated driveline manufacture member who supply major engine and driveline systems for both on highway and off highway “truck” applications.

A current list of TIC members can be found at the end of this submission.

Most TIC members currently provide a range of diesel powered trucks for sale in Australia, one member provides battery electric vehicles (BEVs) only, while six brands provide both diesel and BEV trucks and one member provides diesel and hybrid (diesel/electric) trucks. Whilst alternative powered trucks are available and in use currently in Australia, the Australian truck fleet is dominated by diesel powered trucks, hence TICs interest in Low Carbon Liquid Fuels (LCLF) and specifically Bio-diesel and Renewable Diesel. TIC and TIC members are not involved in the production, importation, or distribution of fuels in Australia, hence TICs interests in fuels lies in the in-service use of mineral diesel and LCLFs, this will be TICs primary focus in this submission.

The first part of this submission will outline the current road freight task and truck park in Australia. The size and make-up of the current Australian truck fleet, emission intensity of the sector, assets life, etc. An understanding of these parameters is required to appreciate the size of the decarbonisation mission facing the heavy vehicle road freight sector as well as the pathways, current and future, that could be deployed in order to transition to a low carbon future.

1. Introduction/background

The Australian Transport Sector accounts for just over 90 Mt CO₂ emissions (or 18%) of Australia's annual GHG emissions. The operation of Australia's national heavy duty truck fleet generates 19.8

Mt CO₂ emissions (or 22%) of all Transport Sector emissions, which equates to about 4% of Australia's total annual GHG emissions.

The Transport Sector has experienced the highest GHG emissions growth of all industry sectors since 1990 and is expected to become the largest source of GHG emissions by 2030, with the national vehicle fleet (both light-duty and heavy-duty vehicles) accounting for around 72% of the forecast 111 Mt CO₂ emissions to be generated by the Transport Sector in 2030.

Road Freight is the most significant mode of transportation for goods in Australia, accounting for approximately 75% of the total domestic freight moved in Australia by total volume. This proportion has been remained largely unchanged since the late 1970's, due principally to the fact that Australia's sparsely populated geography and limited non-road freight infrastructure has meant that this is the most economic mode for movement of freight around the country.

Without significant (and costly) development of alternative national freight infrastructure, the road freight task will continue to grow at the rate of 3.5% to 4.0% per year (a 50% increase every 10 years). This is the typical growth rate that has been witnessed for this sector for decades now.

Constraining this annual growth rate is problematic – if not unrealistic - given that it is directly linked to growth in national economic output and national population growth. In addition, there are several contemporary trends that are further increasing growth of the national freight task. Chief amongst these trends is the following:

- a) The rise of the online economy and digital commerce. This phenomenon has accelerated since COVID and is fundamentally reshaping the nature of the urban road freight task in Australia - from one that was previously optimized around the realization of freight efficiencies (i.e. between manufacturers, distribution centres, and retailers) to one that is increasingly being designed to optimize delivery times for end-customers (i.e. from manufacturer to end customer). This trend is fragmenting the freight task and has given rise to increased annual sales of new urban delivery trucks in recent years.
- b) Changes in logistics industry practices. The past decade has seen a significant change in Australian supply chain practices where goods are no longer warehoused to reduce delivery times to Australian consumers. As a result, manufactured goods are typically transported directly 'off the production line', or 'off the ship', to retailers, or the end customer.

Further, the Australian truck fleet has an average age of approximately 14 years for all vehicles above 3.5t GVM (*BITRE Motor Vehicle Census 2023*). A sobering statistic is that a new truck sold in 2024 will not be retired from the national truck fleet until 2052 based on current truck fleet profile.

The Truck Industry Council has commissioned extensive CO₂ profile modelling of the current heavy vehicle fleet including a prediction of business as usual (BAU) emissions in 2025 and 2030. This work involved the construction of a 2020 baseline fleet using actual ABS Vehicle Census Data. Annual average fleet attrition rates (2015 to 2020) and annual truck sales data were then used to forecast the composition of the national truck fleet in 2025 and 2030. A summary of this modelling is provided below.

The national truck fleet will increase to approximately 850,000 vehicles by 2030, up from 688,000 trucks in 2020. The GHG emissions of the national heavy duty vehicle fleet are forecast to increase to 21.262 Mt CO₂ by 2030. This represents an increase of 2.667 Mt CO₂ (14%) above forecast 2025 levels and an increase of 4.052Mt CO₂ (23.5%) above 2020 levels as shown in Figure 1.

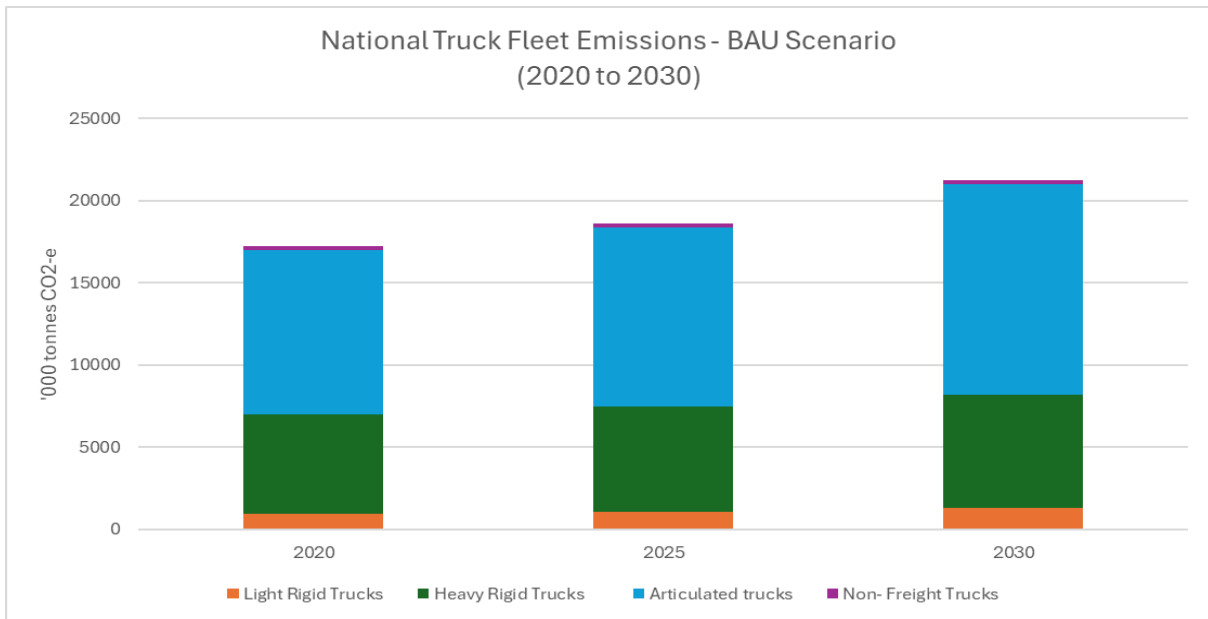


Figure 1: GHG emissions are forecast to increase by 4.052Mt CO₂-e between 2020 and 2030

GHG emissions from articulated trucks will account for 69% of the projected increase between 2020 and 2030 – and 60% of the total GHG emissions produced by the national truck fleet in 2030.

The GHG emissions production rate of a new articulated truck in 2030 is forecast to produce 5.5x more GHG emissions than a new heavy rigid truck, 10.9x more GHG emissions than a new non-freight truck, and 17.9x more emissions than a new light rigid truck (refer Figure 2).

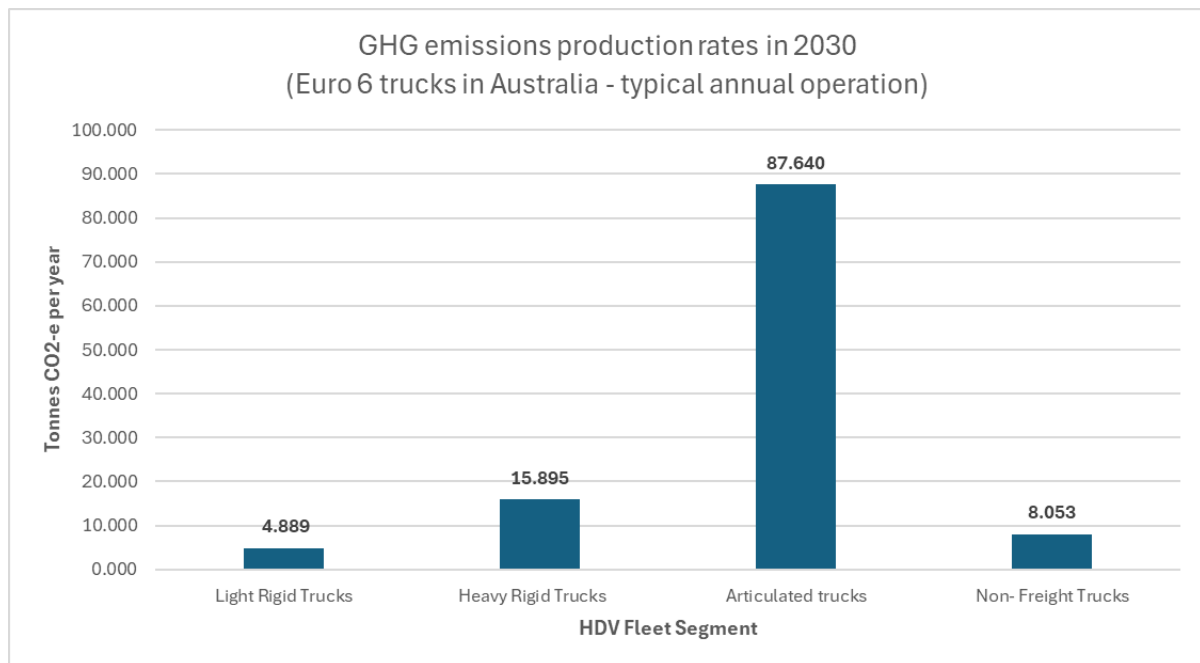


Figure 2: New articulated trucks will produce 5.5 times more emissions than new Heavy Rigid trucks and nearly 18 times more GHG emissions than new light rigid trucks in 2030

In 2023 the new sales uptake of low (diesel/electric hybrid) emission and zero emission trucks was approximately 1%, with an even split (50/50) between zero emission and low emission (hybrid) trucks. TIC is predicting slightly less than the doubling of sales of these vehicle's year-on-year for the next 4-5 years. In 2030 TIC is forecasting that 1 in 4 (25%) of all new truck sales will be zero emission

(over 12,000 trucks/year) and that by 2030 there will be over 20,000 zero emission trucks on Australian roads. However, that will represent less than 2% of the truck fleet and because almost all these trucks will be Light and Heavy Rigid trucks operating in metro/urban environments, the actual CO₂ reduction that these zero emission trucks will deliver will be approximately 1% of the total heavy vehicle truck fleet emissions.

By 2030 approximately 98% of trucks operating in the Australian truck fleet will still require diesel. This is further reinforced by the lack of suitable zero emission truck technology that currently exists for the Articulated Truck and the larger Heavy Rigid Truck (eg: tipper and dog) sectors. Predominantly diesel engined trucks will be required up to and potentially beyond 2040, in these segments.

Hence due to the increasing freight task, the number and average age and long asset life of the Australian heavy vehicle truck fleet, it is obvious that a transition away from diesel, particularly for the Articulated Truck and the larger Heavy Rigid Truck portion of the fleet is many years away. And with these trucks accounting for more than 70% of heavy vehicle CO₂ emissions, low carbon liquid fuels (LCLFs) are the only practical solution for significant carbon abatement in the foreseeable future.

2. The Truck Industry Council's responses to the LCLF Consultation Paper questions

What do you think are Australia's comparative advantages as an LCLF producer? Where does Australia face international competition?

TICs response:

- LCLF feedstocks. Australia's feedstock potential was highlighted in the 2023 CSIRO SAF Roadmap. This report projected that in 2025, Australia will have enough feedstocks to produce 60% of local jet fuel demand using biogenic feedstocks, growing to 90% by 2050. Equally these feedstocks could be used to produce substantial quantities of Bio and Renewable Diesel. Australia possesses a significant feedstock advantage with a diverse array of sustainable LCLF sources, including fats and oils (such as oilseeds, tallow, rendered animal fats, and used cooking oil) and lignocellulosic materials (like straw, cotton trash, sugarcane bagasse, forestry residues, urban waste streams, sugarcane, grasses, woody biomass, and algae). Australia's feedstock potential can effectively meet the increasing demand for LCLF production, while simultaneously sustaining agricultural supply for other purposes. Currently Australia exports large quantities of these feedstocks to international markets for their production of LCLFs, these feedstocks should be used domestically to produce LCLF.
- Highly efficient and effective agriculture sector. Australia's agriculture sector is extremely well positioned to deliver feedstocks for a LCLF industry, as the sector is currently achieving with substantial exports of LCLF feedstock to international markets.
- Use of existing infrastructure. With Renewable Diesel and SAF being drop in fuels for blends currently of at least 50% and in many cases higher and Bio-diesel blends ranging from 5% in the automotive sector up to 100% and for some marine applications, Australia's extensive existing storage, transportation and delivery infrastructure for mineral based liquid fuels can be used directly for LCLFs and LCLF blends.
- Current LCLF production is underutilised: Existing biofuel supplies in Australia (biodiesel and ethanol) are currently underutilised, presenting an immediate opportunity for increased production of these LCLFs domestically.
- Fuel security. In 2021, 91% of all refined product consumed in Australia was imported. This includes imported refined oil and imported crude and condensate that is refined domestically (Department of Industry, Science, Energy and Resources (June 2021) Australian

Petroleum Statistics – Issue 299). By developing a LCLF industry in Australia we can start to address Australia's current fuel security deficiency.

- Strategic geographical location for supply into the Asia/Pacific region. Australia's geographic location provides access to key export markets in Asia and the Pacific region. And with fuel tankers currently leaving Australian shores empty (having unloaded their cargo of imported mineral fuel) we have a ready export opportunity and pathway for Australian produced LCLFs.
- Industry alignment. Australia has an array of stakeholders across the entire LCLF value chain, from feedstock suppliers through to end users of LCLFs who are all ready to act and progress the development of an Australian LCLF industry.
- Highly skilled workforce supported by the R&D/university sectors. With mining and agriculture playing such a key role in Australia's economy, we benefit from a highly skilled workforce in the key areas required to develop, build, operate and maintain a LCLFs sector in Australia.
- Late to the party. There is no doubt that Australia is behind the majority of the world with the development of a domestic LCLF industry. However, we can use this to our advantage by benefiting from the experiences of countries who have established a LCLF industry. By learning from these international examples, successes and challenges, Australia can develop a more effective policy and regulatory framework that maximizes our inherent advantages.

Based on the current policy and market environment, to what extent will Australia rely on imports of LCLF, as opposed to domestic production?

TICs response:

- Australia does not currently produce any SAF or Renewable Diesel domestically and is reliant on imports (largely made from Australian feedstock). However, importing these fuels is cost-prohibitive compared to traditional fuel equivalents, rendering widespread adoption economically unfeasible beyond limited demonstration projects.
- Global renewable liquid fuel demand is set to expand 38 billion litres over 2023-2028, a near 30% increase from the last five-year period (*International Energy Agency (IEA), Renewables 2023*). However, international investment is focussed in countries where governments are actively accelerating the adoption of renewable fuels through ambitious targets, subsidies, blending mandates, low-carbon fuel standards, and funding for projects. Thus, to attract this global investment to support domestic LCLF production and project development, Australia requires the right policy settings.
- Australia does have a small Bio-diesel industry, 3 production facilities. However, the production of Bio-diesel from these facilities has largely been mothballed in recent years with less than 10ML being produced yearly, when the potential combined output of these Bio-diesel refineries is approximately 105ML annually. A clear indicator that the current policy settings for domestic LCLF production are not working.

What mechanism do you think would best support production – through the tax system, contract for difference or grant based funding?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

Are there other mechanisms Government could consider to deliver production support, other than a production tax incentive or competitive grant-based payment? What do you think is the highest priority form of support?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

What are expected production costs of LCLF in Australia? How would you design production incentives to make production competitive in Australia?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

What would an expected rate of support be under a competitive grant-based production scheme (contract for difference or fixed grant amount per production unit)?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

How many producers would you expect a production incentive scheme to support in Australia?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

How could the introduction of a production incentive scheme affect competition in fuel production and supply markets, and also amongst fuel users?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

What are the expected timeframes for when an industry would be sustainable without support from Government?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

How should production support be funded, and how could this best be aligned with the beneficiaries of the production support?

TICs response:

- TIC and TIC members are not involved in the production of transport fuels, conventional, or low carbon, therefore TIC is not positioned to provide feedback on this question.

Would production support need to offer a different rate of incentive for SAF and renewable diesel?

TICs response:

- TIC notes that the current national discussion about LCLFs has implied that the market development strategies for both sustainable aviation fuels and renewable diesel (on-road and off-road use) will likely be similar. However, TIC contends that the characteristics of

these two markets are dramatically different in terms of services provided to society, scale and market behaviours. Hence TIC believes that the strategies for the development of the markets for these two fuels will likely need to be differentiated.

- As highlighted in the consultation paper, production incentive/s or demand-side measures designed neutrally for LCLFs would likely favour Bio-diesel and Renewable Diesel due to their lower production costs, potentially putting SAF at a disadvantage.
- It is important to recognise that electrification via BEV trucks and/or Hydrogen Fuel Cell will increasingly become feasible (probably beyond 2035) for many diesel-reliant truck sectors (currently only practically/economically viable for some metro/urban truck operations). Noting that other sectors currently using diesel engines may remain reliant on this fuel for a greater period than the truck sector. However, SAF will likely be the only viable decarbonisation option for aviation and thus SAF will be required in aviation past 2050.
- Currently and for the mid-term however, there is an increasing demand/requirement for Bio-diesel, Renewable Diesel and SAF. Noting that production methods for each of these LCLF may require/can only accept, specific feedstocks. Importantly, when considering Renewable Diesel and SAF, the two most viable current production methods, HEFA and Fischer-Tropsch, produce BOTH of these fuels concurrently with neither fuel able to be produced without significant quantities of the other. Generally, a given amount of suitable feedstock will commercially produce 55% Renewable Diesel and 45% SAF by volume from these two production methods. These percentages can be moved slightly, within production limitations, but are fundamentally linked.
- Thus, policy needs to not only ensure access to LCLFs to decarbonise hard to abate sectors WITHOUT favouring any specific LCLFs, policy must also be designed to ensure there is a market demand/use for Renewable Diesel and SAF in the quantities that would be produced locally (this could include international demand for these fuels and hence potential exports to “balance” the use of these locally produced LCLFs). Failing to create such policy settings would eventuate in Renewable Diesel subsidising SAF, or vice versa. Hence, policy design must enable and encourage the acceleration and deployment of multiple low carbon fuel types to support decarbonisation of key sectors with a recognition that not all fuels are equal in cost and demand and that locally produced Renewable Diesel and SAF volumes will be linked to a large extent by production methods for the foreseeable future.
- For imported Renewable Diesel, or SAF, volumes can be imported as required, for example only Renewable Diesel, or only SAF. However as detailed above, the local Australian production of these fuels, using the two most viable current production methods, will produce close to equal quantities of both Renewable Diesel and SAF. Hence policy settings must consider the local coproduction of these fuels and policy should not consider these fuels in isolation.

Would a potential production support program need to prescribe certain proportions of production volumes towards SAF or renewable diesel?

TICs response:

- Please refer to TICs response to the preceding question.

Would production support need to provide different levels of support for emerging and established production pathways? What are some of the design considerations Government should consider?

TICs response:

- Fundamentally TIC does not support “picking winners” with regard to technology. For example, TIC is agnostic with regard to the transition of the heavy vehicle sector to net zero, taking the view that a mix of technologies will be required, LCLFs, BEV trucks, Hydrogen ICE

and Hydrogen Fuel Cell as well as freight efficiencies via productivity improvements. And that these carbon abating solutions will have “their time” over the coming decades during the transition.

- However, in the short to mid-term, LCLF and specifically Bio-diesel and Renewable Diesel will be required as the only means of decarbonising the existing truck fleet, that due to its long asset life, will be predominantly diesel powered beyond 2035/2040.
- HEFA production technology is presently the most mature and investment-ready pathway for Renewable Diesel and SAF production. HEFA is also the lowest cost and most mature technology pathway, with approximately 85% of Renewable Diesel and SAF facilities expected to come online in the next five years to likely utilise HEFA production technology. However, HEFA is reliant on oil-based feedstocks (inedible animal fats (tallow), used cooking oil, canola and other oil seed crops and industrial greases). This will ultimately limit the production capacity of LCLF via the HEFA pathway. Hence there will be a significant imperative to diversify and scale up LCLF production through a range of other technologies and feedstocks to meet growing demand beyond 2030/2035. This includes expanding production through emerging technologies such as Alcohol-to-Jet, which uses ethanol or butanol fuels, and Fischer-Tropsch, which utilises bio/agricultural wastes and residues. Looking further ahead (2035/2040), Power-to-Liquid technologies, which produce liquid hydrocarbons synthetically using renewable electricity, water, and carbon dioxide (CO₂), will also contribute to expanding LCLF production capacity. The choice of LCLF production technology will be heavily influenced by local feedstock availability and supply chain costs. Therefore, government has an important role to play in steering the development of the industry to develop technologies and facilities that are most suitable for the long-term development of an LCLF industry in Australia, particularly beyond 2030/2035.
- In summary, to maximise the immediate potential of LCLFs, it is crucial for governments to reestablish the existing Bio-diesel production capacity in Australia, as well as fully leverage HEFA's technological and commercial readiness. At the same time, it is essential to support and recognise in policy design emerging technologies to ensure continued future production growth. Therefore, a combination of mechanisms that support established pathways, as well as policies that specifically de-risk emerging technology, could be effective to maximising domestic production capabilities, in the short, mid and long-term.

What policy approaches are technology agnostic, applying efficiently to new technologies as they emerge?

TICs response:

- Please refer to TICs response to the preceding question.

Do you support an emissions reduction threshold being included as part of eligibility criteria for fuels to receive support under a production incentive program?

TICs response:

- Existing and new LCLFs, including Ethanol, Bio-diesel, Renewable Diesel and SAF, should stipulate the inclusion of emissions reduction thresholds as part of the eligibility criteria for fuels to receive support under a production incentive program. However, during the early stages of development, it is key that the criteria are sufficiently inclusive to encourage widespread LCLF production and usage, matching supply and demand. A balanced approach could prioritise fuels with the highest emission reductions through a tiered system where different levels of emission reduction receive varying degrees of support or incentives.
- To support this position, TIC notes that the European Union’s Renewable Energy Directive II [reference, Directive - EU - 2023/2413 - EN - Renewable Energy Directive - EUR-Lex (europa.eu)] stipulates an emissions reduction of at least 65%. By comparison, the USA’s

Renewable Fuel Standard stipulates a life cycle emissions reduction of at least 20% compared with conventional fuels [reference, Final Renewable Fuels Standards Rule for 2023, 2024, and 2025 | US EPA)]. Such fuels could reasonably be blended with conventional fuel initially to deliver a lesser GHG emissions benefit, with a view to a requirement for progressive increase in blend renewable diesel concentrations (and hence increased GHG emissions) over time.

What threshold would you seek be included in eligibility criteria (for example 50 per cent emissions reduction relative to conventional fuels, or another emissions reduction ratio)?

TICs response:

- TIC supports a tiered system where different levels of emission reduction receive varying degrees of support or incentives, rather than a 'one size fits all' minimum threshold. This would allow the timely reestablishment of existing Bio-diesel production capacity in Australia, whilst allowing the carbon intensity of this fuel to be lowered over time with upgrades to production facilities (eg: use of renewable electricity/energy in production, lower carbon feedstocks and transportation).

Do you think any threshold should increase over time?

TICs response:

- Yes, TIC supports thresholds that are periodically reviewed and gradually increased as technology advances and emissions reduction opportunities present. This approach enables the deployment of existing pathways while encouraging the deployment of new technologies. It provides a clear signal for continuous improvement in emissions performance, fostering innovation and supporting decarbonisation. Also please refer to TICs response to the preceding question.

Do you think incentives should be included to encourage emissions reduction in addition to a minimum eligibility threshold?

TICs response:

- TIC supports a tiered system where different levels of emission reduction receive varying degrees of support, or incentives, based on the actual decarbonisation outcome delivered.

If you don't support a threshold, what emissions requirements do you think are better?

TICs response:

- Please refer to TICs response to the preceding question.

Do you have views on the sustainability criteria under consideration as part of the criteria?

TICs response:

- TIC supports the expansion of the Guarantee of Origin Scheme to include LCLFs. Inclusion in the Guarantee of Origin Scheme ensures that LCLFs can compete on equal footing with other energy sources in energy markets. This is vitally important in the road transport sector that is currently deploying BEV trucks as a means of decarbonisation and will intime use Hydrogen in both ICE and Fuel Cell applications to aid decarbonisation. Such a metric is required to stimulate market competition, fosters investor confidence, accelerates project development and will lead to increased uptake of CO₂ reduction technologies and in turn reduce carbon emissions from the heavy vehicle truck sector.
- The sustainability criteria for the inclusion of LCLF in the Guarantee of Origin Scheme should substantially align with existing international models while also being adapted to suit Australia's specific context/parameters, support local feedstocks and importantly

acknowledge the unique efficiencies and characteristics of the Australia agricultural sector (eg: land use parameters MUST factor in Australia's land mass, land use and sparse population, a very different scenario to the land use issues pertaining to Europe and much of Asia).

What additional or alternative criteria would you want to see form part of the criteria?

Do you have any other views on emissions and sustainability criteria?

TICs response:

TIC highlights the importance of the Government leveraging existing international schemes, where practical/applicable, so that Australia's LCLF sustainability criteria can be established quickly.

What are the community benefits associated with LCLF production in Australia?

TICs response:

- Employment and economic growth. A LCLF industry can offer substantial employment and development opportunities particularly for regional Australia.
- Agricultural revenue streams. Australian LCLF production will, at least in part, rely on agricultural feedstocks, providing surety for many existing farms and the potential for additional revenue streams for farmers, whilst supporting rural development and diversification.
- Job retention and transition. A LCLF industry will enable traditional/legacy energy workers to retain their jobs while adapting to cleaner energy technologies. Or transition from industries such as the coal sector to the low carbon energy fuels sector.
- Australian Fuel security. An Australian LCLF industry has the immediate potential to reduce our reliance on imported fuels. This would build over time and Australia could conceivably be liquid fuel self-reliant by 2050.
- Waste management solution. LCLFs support a circular economy, where waste is transformed to future fuels. A domestic LCLF market would incentivise the recovery and use of household, industry and agricultural residues/waste.
- Preserves Australia's tourism industry. Ensuring Australia maintains international connectivity by enabling refuelling of international planes and ships with LCLFs that meet global decarbonisation standards and mandates.

What options should the Government consider in its regulatory impact analysis, such as a mandate introduced over time, low carbon fuel standard connected with a trading scheme, a non-binding target or other demand options?

TICs response:

- TIC supports the implementation of a blending mandate for Bio-diesel, Renewable Diesel and SAF to be introduced concurrently on all three LCLFs and at a point in the fuel supply chain no later than the fuel wholesaler. Such a mandate needs to be applied nationally by the federal government and not at State and Territory level and should not be applied at the fuel retail point.
- Mandates should be legally binding on wholesale fuel suppliers. Non-binding mandates and/or mandates applied at the fuel retail point have failed in Australia previously. A similar failure would likely occur if State based, rather than national, mandates applied.
- Concurrent blend mandates should be applied to Renewable Diesel and SAF as the local production of these fuels, by current production methods, will produce close to equal quantities of both Renewable Diesel and SAF concurrently. Without appropriately

apportioned blend mandates for these two LCLFs there will be the risk that Renewable Diesel sales will subsidise SAF sales, or potentially vice versa.

- Mandated volumes of Bio-diesel, Renewable Diesel and SAF must be accompanied by a fuel carbon trading scheme, or a book and claim scheme. Allowing the specific LCLF to be blended close to its production (or import) source. Hence ensuring that the carbon abatement potential of the fuel is maximised and not reduced by needlessly transporting the LCLF across Australia to ensure an even distribution of the blended fuel across the nation. This will be particularly important in the early stage of LCLF blending in Australia (potentially to 2030/2035), when supply of Bio-diesel, Renewable Diesel and SAF will be limited.
- A blending mandate would create a stable demand for LCLFs, encouraging investment in its production and distribution infrastructure. This can lead to economies of scale, reducing costs over time to a point where subsidies could be minimised, or potentially abandoned. A clear blending mandate also provides regulatory certainty for businesses, allowing them to plan long-term investments.
- TIC notes that the recommended targets could be progressively increased to ensure continuous improvement and sustained momentum in reducing CO₂ emissions. This approach would provide clear, long-term signals to the market, encouraging investment in low-carbon fuel technologies and production. Incremental increases in the blend mandate would also help mitigate any potential 'financial shock' to fuel users and their associated industry, allowing businesses to adapt in a manageable way.
- TIC has undertaken a review of current and near-term (to 2030) potential Australia LCLF production and based on this analysis proposes the following potential LCLF blend mandates:

Bio-diesel production facilities (3 currently in operation):

Current capacity: 100 – 105 million litres/year

Current production: 5-10 million litres/year (primarily for mining and marine use)

Potential Bio-diesel capacity by 2026: 105 million litres/year

Proposed Renewable Diesel refineries (Ampol and BP) projected to commence production 2029/2030:

Combined projected volume by 2030: 2,550 million litres/year (Renewable Diesel and SAF combined)

Both refineries plan to use HEFA technology that commercially produces approximately 55% renewable diesel and 45% SAF

Renewable Diesel production (55% of total): 1,403 million litres/year

Total Australian LCLF production by 2030 (including Bio-diesel from refineries currently operating):

1,500 million litres/year

Based on the above volumes and proposed production timelines, TIC proposes the following minimum blend mandates be applied to mineral diesel sold in Australia:

Bio-diesel mandates:

A 0.3% Bio-diesel mandate by the end of 2026

A 0.6% Bio-diesel mandate by the end of 2028

Bio/Renewable Diesel mandate:

A R5 mandate by the end of 2030

Aspire to introduce a R10 mandate by the end of 2035, or a similar CO₂ reducing Low Carbon Fuel Standard (see dot point below)

The above blend mandates will likely lead to a small increase in the diesel fuel price across Australia when implemented. TIC believes that commercial users of diesel, heavy vehicles (trucks above 4.5t GVM), agriculture, mining, rail, marine, etc. could be compensated through existing tax mechanisms such as the fuel tax rebate. TIC believes that light vehicle motorists should not be financially compensated for using these LCLF diesel blends, as the price increases would amount to just a few cents per litre of diesel and introduced over a number of years. Also, the slight increase in diesel fuel

price could be used to temper the purchasing behaviour of light vehicle owners, making the purchase of plug-in hybrid and battery electric light vehicles more attractive.

- TIC supports a transition from blending mandates to a Low Carbon Fuel Standard (LCFS), potentially to be introduced by 2030. Ultimately a LCFS would provide a more robust and potentially more practical and manageable measure of the carbon intensity of LCLFs and LCLF blends across Australia and allow better/simplified administration of the fuel carbon trading scheme.

3. Additional TIC comments

- Extending excise/fuel tax mechanism to all LCLFs. Supportive taxation treatment is required to support a LCLF industry in Australia and this should include maintaining and extending excise/fuel tax mechanism to support 'new' LCLF such as Renewable Diesel. For example, TIC recommends that Renewable Diesel receives similar excise taxation treatment as Bio-diesel. Without such treatment, the business case for a Renewable Diesel project becomes less attractive, diminishing the likelihood of its progression and hindering the growth of new renewable fuels in the Australian market.
- LCLF blending support. To achieve cost effective blend mandates, or a Low Carbon Fuel Standard, robust but simple, processes will be required to produce LCLF/mineral diesel blends. Such fuel blends must have a high level of quality assurance and ensure ongoing compliance to Australian fuel standards. This is essential to ensure that LCLF/mineral diesel blends can be safely run in all diesel engines across all vehicle and machinery types throughout Australia. In Europe this is achieved by volume mixing of Bio-diesel and/or Renewable Diesel with Mineral Diesel. A suitable LCLF/mineral diesel blend is achieved in Europe WITHOUT the requirement for post blending fuel quality testing. In Europe, volume blending occurs at, fuel refineries, fuel storage facilities, fuel transport tankers, forecourts, etc. Europe can achieve blends of LCLFs and mineral diesel, 'on the fly', efficiently and cost effectively by having suitable Mineral Diesel (EN590), B100 (EN14214) and R100 (EN15940) fuel standards. In Australia we are unable to use this simple blending method due to some inferior parameters within the Australian Mineral Diesel Standard. Bio/Mineral Diesel blends in Australia require post blending fuel quality testing to ensure continued compliance with the Australia Mineral Diesel Standard. Australia's B100 Fuel Standard is equivalent to EN14214 and the Department of Climate Change, Energy, the Environment and Water is working with industry, via the Fuel Standards Consultative Committee, on the development of a R100 Fuel Standard that will hopefully be equivalent to EN15940 (noting the Australian requirement for a slightly higher Flash Point for compatibility with our existing infrastructure). TIC notes that with over 90% of diesel used in Australia coming from imports and with local fuel monitoring/testing, by both the Department and industry, showing that this internationally manufactured mineral diesel typically meets the requirements of EN590 (noting that this imported mineral diesel also meets the Australian requirement for a slightly higher Flash Point to ensure compatibility with our existing infrastructure), that it could be possible to conduct European LCLF/mineral diesel volume blending in Australia using these imported fuels and locally produce B100 (and hopefully soon with locally manufactured, or imported, R100, if an equivalent, to EN15940, Australian standard is developed for Renewable Diesel). To enable European LCLF/mineral diesel volume blending in Australia TIC proposes that a second, alternative, Mineral Diesel Standard is developed, completely aligned with EN590, save for the Flash Point that would need to be changed to 61.5°C minimum. Once in place, mineral diesel fuels complying to this new alternative Mineral Diesel Standard could be volume blended with up to 5% B100 and/or a yet to be determined percentage of R100 (TIC proposes a maximum 50% R100 blend at this point in time), at multiple locations throughout the diesel fuel distribution network in Australia, without any requirement for post blending fuel testing.

I trust that you find TIC's submission acceptable and that the issues that have been raised in this submission will be considered in the development of policy and regulatory settings to support the development of an Australian Low Carbon Liquid Fuels industry.

Please contact the undersigned, on [REDACTED] or [REDACTED] for any questions about this submission.

Yours faithfully,

[REDACTED]

Mark Hammond
Chief Technical Officer

Truck Industry Council member Brands:

Allison Transmissions Australia
Eaton Transmissions Australia
Cummins Engines
Detroit Engines
DAF Trucks
Dennis Eagle Trucks
Foton Mobility Trucks and Vans (provide BEV trucks only)
Fuso Trucks and Busses
Freightliner Trucks
Hino Trucks
Isuzu Trucks
Iveco Trucks, Busses and Vans
Kenworth Trucks
Mack Trucks
MAN Trucks and Busses
Mercedes-Benz Trucks
Mercedes-Benz Vans
Scania Trucks and Busses
UD Trucks
Volvo Trucks and Busses
Western Star Trucks