Transport and Infrastructure Net Zero Consultation Roadmap

Take the survey

Department of Climate Change, Energy, Environment and Water

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Yes

5 First name
Cameron

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Rimington

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Not answered

9 Who are you answering on behalf of?

Organisation

10 Organisation name

MOV3MENT

11 What best describes you or your organisation?

Industry

12 What sector do you represent?

Heavy road vehicles (trucks, buses etc.)
Light road vehicles (cars, utes etc.)
Energy

13 What state or territory do you live in?

Queensland

14 Postcode

4000

15 What area best describes where you live?

City

16 1. Do you support the proposed guiding principles?

Yes

17 1.1 Please add details to your response.

MOV3MENT urges government to implement the principle of 'neutrality' to facilitate all promising technology options, not some at the expense of others. Australian governments have been quick to embrace the potential of hydrogen as a transport fuel and have committed significant funds to developing refuelling locations. It is already clear electrification and battery-power will be a solution for many road applications but there is no apparent investment in an equivalent charging network for electric trucks as there is for hydrogen. With barely 25 years to decarbonise Australian freight, governments and investors cannot afford to back the wrong horse.

18 2. Do you support the use of the avoid-shift-improve framework as a tool to identify opportunities for abatement?

No

19 2.1 Please add details to your response.

While the Avoid-Shift-Improve framework is conceptually helpful, it suffers from two main drawbacks:

1. Policies to "avoid" or "shift" trips largely require long-term changes to urban structure, settlement patterns, or transit networks. Despite decades of investment and policy effort, Australia has made only limited progress in managing demand and mode-shifting. For emissions reduction in the 'decisive decade' before 2030, we are largely stuck with the road-dependent transport patterns we have today.
2. Current "improve" policies overwhelmingly focus on ZEV sales at the expense of improving how the current fleet operates. For long-lived assets like trucks, this is insufficient. Better fuel efficiency offers one of the only pathways to cut emissions from legacy vehicles already on Australian roads. There is no credible pathway to net zero without it.

MOV3MENT urges policymakers, industry leaders, and researchers to clearly distinguish the efficiency opportunity as a guiding principle for transport decarbonisation. MOV3MENT recommends focusing 'Improve' policies on the current fleet and adding a fourth category: Avoid-Shift-Improve-REPLACE, to focus on fleet turnover (refer attached submission).

20 3. Do you agree the development of a national policy framework for active and public transport will support emissions reduction?

Yes

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?

Road transport is not decarbonising fast enough. But the current trajectory is not fixed and can be influenced with effective policies. Knowing what is realistically possible with current technologies and practices gives us something to aim for, and addressing barriers to improvement provides a path to make it happen. To date, both government and industry have focussed overwhelmingly on switching the energy source for transport, with uptake of zero-emission vehicles (ZEVs) garnering most investment and policy support. However, there is no credible path to zero emissions without improving fuel efficiency and vehicle productivity.

25 6.2. How would these actions address the identified challenges and opportunities for emissions reduction in the movement of goods?

Combining efficiency improvements with the other decarbonisation pathways could achieve around 25% reduction in road transport emissions by 2030, relative to today's levels. The challenge is to now scale this across the sector. Overseas markets, and some Australian fleets, show us this level of improvement is already achievable using technologies that are operationally practical and financially viable today.

In fact, 40% emissions reduction is potentially achievable if announced battery breakthroughs are commercialised quickly, if fleets embrace efficiency more ambitiously, and if more renewable fuels are supplied. That's why MOV3MENT is calling on every transport user, provider, and policymaker to adopt the challenge of a 25% reduction in road transport emissions by 2030. It's not just achievable, it's necessary.

26 7. Do you agree with the proposed net zero pathway for light road vehicles?

No

27 7.1 Please add details to your response.

The pathway for long-term emissions reductions in this sector is already clear: it is battery electric vehicles (BEVs). In several segments, BEVs are already cheaper than petrol and diesel cars when assessed on total cost of ownership and retail prices are already coming down as competition increases. However, in some popular segments there are no competitive or cost-effective models yet available. For this reason, hybrid vehicles will continue to play a significant role in the short/medium term until more BEV models are introduced and public charging infrastructure is deployed more widely.

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?

- Strong penalties & enforcement of the NVES
- Support workplace charging for EVs
- Link EV incentives with renewable energy

29 8.2 How would these actions address the identified challenges and opportunities to reduce light vehicle emissions?

Monitoring and compliance will likely determine the effectiveness of the NVES scheme. In the past, many global OEMs did not send EV models to Australia precisely because the revenue on a sale here was outweighed by strong penalties in regulated markets overseas. Weak penalties in the NVES enforcement mechanism could drive similar behaviour amongst local importers weighing the incremental revenue for non-compliance against the size of any penalty. MOV3MENT urges government to be equally ambitious in setting and enforcing penalties for non-compliance as it has been in setting the upcoming targets

MOV3MENT recommends future government investment prioritises small-medium enterprises to “future-proof” their workplaces with tailored, cost-effective EV charging equipment, noting that most businesses won't require DC charging or expensive electrical upgrades. To smooth the transition and improve transparency, we also recommend future investment be tied to data sharing and reliability/uptime targets.

To maximise decarbonisation in Australia's light vehicle fleet, MOV3MENT recommends future government incentives for EVs be linked to renewable energy generation. Detailed policy design could include requiring Green Power Purchase Agreements or including mandatory criteria for renewable energy certificates, or a link to the Federal Government's flagged Certificate of Origin scheme for various fuels. Making EV subsidies conditional on renewable energy would be a novel way of ensuring the emissions abatement in the transport sector does not unintentionally increase emissions in other sectors.

30 9. Do you agree with the proposed net zero pathway for heavy road vehicles?

No

31 9.1 Please add details to your response

In individual supply chains, there is significant uncertainty as to the best alternative energy pathway to pursue. Increasing emissions from trucks are partly explained by the low adoption rate of alternative fuels and advanced powertrains in the Australian truck market. All options currently add costs compared with diesel, but the transition will have differential risks and impacts. There are around 700,000 trucks registered in Australia, with about five times as many rigids as articulated trucks. Despite being fewer in number, articulated trucks on average have higher fuel consumption and drive further, so they collectively produce around one third more emissions than all rigid trucks combined. This data points to a new area of focus for industry and policymakers: in addition to electrifying urban trucks, support is more effectively directed towards decarbonising the big hitters of the freight task. This is a much smaller cohort: semi-trailers and B-Doubles operating on just a few main freight routes, particularly the east coast highways. Investing in the infrastructure to support more of these trucks, and de-risking the transition cost for early movers, will achieve greater and faster decarbonisation, contributing a 7% reduction in total truck emissions by 2030.

Irrespective of the specific pathway chosen (e.g. electrification, renewable fuels, or both), doing something for this trucking segment is paramount. Applying a blending mandate using 10% biodiesel/renewable diesel, would allow those trucks that cannot reasonably be electrified to reduce emissions without significant upfront investment or major operational changes.

Around 98% of truck operators are small/medium businesses; 70% own just one truck. Owner-operators and small businesses have limited ability to finance the transition to low-emission freight. For them, an unsupported transition to net zero represents an existential threat. For these operators, fuel efficiency is a more cost-effective path toward decarbonisation. It is also a message more likely to resonate: achieving emissions reductions while simultaneously reducing costs and building business resilience. MOV3MENT's experience with truck fleets of all sizes indicates that fuel efficiency opportunities are not well understood (see attachment for further detail).

Australian experience suggests most fleets can find 10-15% fuel savings (and commensurate emissions reductions) through a combination of simple and cost-effective improvements, if they had more guidance and information on suitable products. Driver training alone can generate up to 20% savings in some fleets. More needs to be done to increase both confidence in fuel savings technologies and their availability in the market. Overall, we have assumed a conservative 13% potential emissions saving across the entire truck parc using a combination of retrofit technologies and improved fleet practices.

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.

1: Low carbon liquid fuels
2: Battery electric
3: Hydrogen fuel cell

33 10.1 Please add details to your response. Why did you rank them in that order?

There are already electric trucks in Australia today that can drive approx. 450km in semi-trailer configuration before needing to recharge. Models available overseas have achieved 750km between charges and driven more than 1700km in a day. These models cannot cover the full spectrum of Australian applications or the hardest operational requirements in terms of trip time or payload. But they would suit a large proportion of inter-capital city shipments that are not mass constrained. And with technology developing rapidly, the next generation of battery powered trucks will deliver even better capability.

34 ## 11. What role should low carbon liquid fuels play in the heavy vehicle decarbonisation?

Successfully integrating policies for low carbon liquid fuels may be the most decisive factor for freight decarbonisation in Australia. Sustainable liquid fuels can play an important bridging role, accelerating the transition across the existing fleet until technology advancement and fleet replacement occurs. Use of sustainable liquid fuels will then likely reduce over the long term.

Sustainable liquid fuels should be ‘drop in’ so that they can be used without engine modifications, which may imply limiting blend proportions with diesel. This would provide the greatest potential impact through broad scalability across existing assets. The most promising LCLFs are: renewable diesel (e.g. HVO); biodiesel blends (e.g. B20); ethanol-blended fuels (E10); synthetic fuels.

Governments should support availability of sustainable liquid fuels by introducing mandatory blending limits, co-designed in close collaboration with industry, but MOV3MENT recommends starting at a minimum blend ratio of 10%.
Securing enough fuel supply for this mandate will be challenging as international demand is already directing offshore most of Australia’s raw biomass feedstock. Road freight will also face demand competition from maritime and aviation. Government support for refining capacity should therefore be actively considered as part of broader fuel and energy strategies. The ‘carrot’ to the ‘stick’ of fuel blending mandates should therefore be tax offsets, accelerated depreciation, duty reduction, extending the fuel tax credit or other incentives to support onshore production of low carbon drop-in fuels.

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?

Government incentives that either bridge the price gap or partially subsidise the cost premium have been successfully deployed worldwide. In Australia, governments have provided significant financial support to passenger vehicle EV purchasers. MOV3MENT therefore strongly advocates for at least a commensurate level of government support for trucks. More needs to be done to simplify access to government funding, particularly for smaller operators.

A lack of concise information, credible advice on real-world benefits, low confidence in technology, lack of support, poor data foundations, and limited time for research, all prevent everyday operators from reducing their emissions. So long as this remains the case, emissions in the on-road fleet will remain high. A successful overseas approach is government support for a dedicated demonstration/verification program for technologies that can cut emissions. Such trials should not be limited to zero emission vehicles; cutting trucking emissions will require equipment fitted to legacy vehicles as well.

Planning and incentives for the development of a network of highway charging infrastructure are required. This is not a new concept – Australian governments are enthusiastically doing this for light vehicle charging. But to date, there seems to be little appetite to support an equivalent network for trucks. Decarbonising one articulated truck in long haul operations can deliver 9 times the abatement of decarbonising smaller urban delivery trucks. Therefore, their ability to conveniently access ultrafast charging on urban, regional and interstate highways is a critical foundation.

Government and industry must work together to ensure operators better understand how to reduce their energy and emissions be it through technology assessments, verification programs, reports, videos, factsheets or calculation tools. This approach is not new. Disseminating the findings of research, trials, projects, and events is a key part of facilitating industry change. Efficiency must be a core early focus of that process.

Government routinely delivers programs to support other entire sectors improve energy efficiency and decarbonise, often including independent experts conducting site energy audits and opportunity assessments to identify areas for improvement and cost savings. Nothing equivalent exists for the transport sector, despite it already being the biggest user of primary energy in Australia, and likely the biggest source of emissions by 2030. Consistent with the Avoid-Shift-Improve(-Replace) framework, it is by doing more with less that some of the largest emissions reductions can be realised. A government initiative to fund and/or subsidise expert advice for freight fleets is sorely needed.

Differentiated access for zero emission vehicles (allowing night-time delivery, toll amnesties, special use lanes, preferential access/fees at ports/terminals) is one proven method for accelerating fleet turnover overseas. Low or Zero Emission Zones regulating access to a specific geographical area have been successfully paired with ZEV purchase incentives abroad. Given Australia's highly urbanised population and the almost total reliance on road freight in such areas, the introduction and policy design of access restrictions must be introduced and co-designed with utmost care.

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?

No

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?

Australia is uniquely positioned to benefit enormously from electrified road freight thanks to our low-cost renewable energy resources and concentrated freight networks. Providing the necessary transport infrastructure to support this is not a new concept – Australian governments are enthusiastically doing this for light vehicle charging. But to-date, there seems to be little appetite to support an equivalent network for trucks.

By contrast, State and federal governments have already supported the beginnings of a Hume Hydrogen Highway refuelling network on the east coast, despite a lack of available hydrogen truck models and few current commercial advantages over the latest battery-electric models. It is already clear electrification and battery-power will be a solution for many truck applications; but there is no apparent investment in an equivalent charging network for electric trucks as there is for hydrogen.

MOV3MENT advocates strongly for Government planning and incentives to develop a defined network of highway charging infrastructure which is required for OEMs to bring electric truck models to Australia and for freight operators to have the confidence to invest in electric alternatives.

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?

Since road transport makes up the overwhelming majority of total transport emissions, prioritising LCLFs for this transport mode offers the single biggest decarbonisation opportunity. Consistent with the Roadmap's first guiding principle to maximise emissions reduction, neither aviation nor maritime nor rail can possibly deliver the abatement potential that decarbonising road transport offers and LCLF policy should reflect this.

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?

Government and industry must work together to ensure operators better understand how to reduce their energy and emissions be it through technology assessments, verification programs, reports, videos, factsheets or calculation tools. Disseminating the findings of research, trials, projects, and events is a key part of facilitating industry change.

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?

Initiatives such as Smartway (USA), Zemo Partnership (UK), Objectif CO2 (France), and NACFE (USA) all provide independent, trusted information for fleets to use in their decision making, be it technology assessments, verification programs, reports, videos, factsheets or calculation tools. The design of information programs and other support measures is already well understood. MOV3MENT has benchmarked overseas initiatives and would gladly provide more specific information on request.

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?

MOV3MENT strongly advocates for a co-designed approach to progressing the proposed pathways and finalising the Roadmap. Sustained and ongoing engagement with industry experts could be realised through a Standing Industry Reference Group, including specialists on transport efficiency and energy use. MOV3MENT stands ready to contribute to any such outreach from the Department.

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

Submission_MOV3MENT_240806.3478dea3_Redacted.pdf

69 Upload a submission

Not answered

70 Upload supporting file

Not answered

71 Upload supporting file

Not answered

Net Zero Unit
Department of Infrastructure, Transport,
Regional Development, Communications & the Arts
GPO Box 594
CANBERRA ACT 2601

By email: netzero@infrastructure.gov.au

06 August 2024

To whom it may concern,

Submission to Transport & Infrastructure Net Zero Consultation Roadmap

MOV3MENT is pleased to provide the following submission in response to the Government's Transport & Infrastructure Net Zero Consultation Roadmap. We understand this is the key document informing the pathways and policy actions the Government will take to decarbonise transport. Ensuring it achieves the right balance of both short- and long-term cost-effective actions is therefore critical.

MOV3MENT is a specialist consultancy on a mission to decarbonise road transport. Our clients trust us to develop practical and cost-effective strategies to reduce vehicle-related emissions. They include fleets, government (QLD, NSW, TAS, WA, ACT and the Commonwealth), vehicle manufacturers, and industry associations (TIC, Natroad, HVIA). As Australia's only consultancy dedicated to energy efficiency and decarbonisation of heavy vehicles, our submission focuses on implications for trucks and road freight.

While we applaud the Roadmap's focus on zero emission vehicles and low carbon liquid fuels, it largely misses the critical role of **efficiency: the fastest, cheapest, most effective decarbonisation path.** Our submission therefore focuses on maximising emissions reductions from all three paths. Our recommendations include:

1. Strong penalties and enforcement of the NVES
2. Support for workplace charging of EVs
3. Linking EV incentives with renewable energy adoption
4. Easier access to greater grant funding for low emission trucks
5. Trials and technology verification program
6. Enroute electric charging infrastructure for trucks
7. Trusted information and tools
8. Subsidised fleet assessments
9. Renewable fuel mandate and funding
10. Clean air zones in cities

In addition to our responses to the Roadmap's specific questions, MOV3MENT offers the attached submission. We would welcome any opportunity to discuss this with the Department in further detail.

Your sincerely,

[redacted]

Mark Gjerek
Founder & Director

MOV3MENT

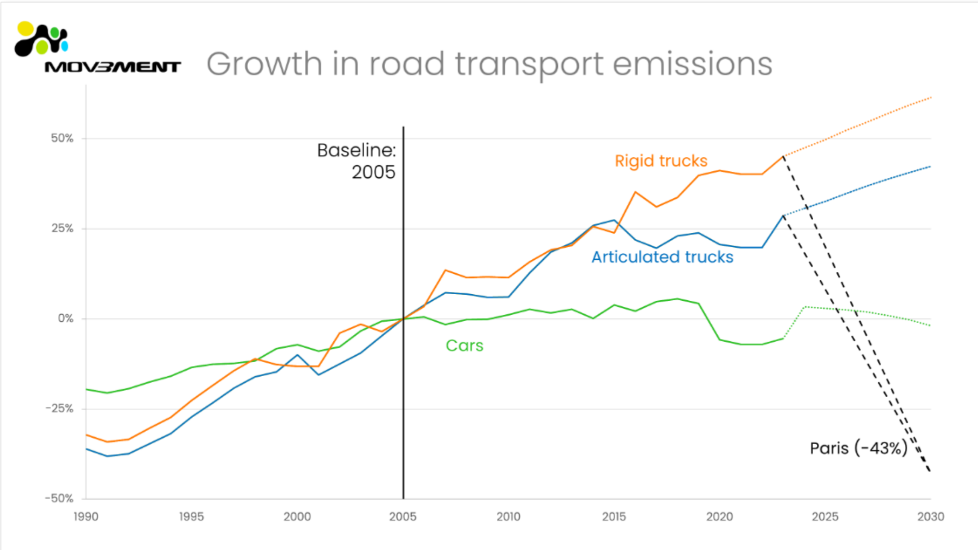
transport energy environment

Policy Priorities for Net Zero Road Transport

Transport in Context

Transport generates **roughly one fifth of national emissions**. Not every sector needs to meet Australia's emissions reduction target in 2030 (-43%) and 2050 (net zero), but these targets aren't achievable without dramatic and substantive emissions cuts from transport. This is because aggregate **emissions from the transport sector continue to increase**, not decrease. The sector must therefore reverse its emissions trajectory in this 'decisive decade' before 2030, even as the freight task and population continue to grow.

Most other industries are already achieving reductions and the decline in electricity emissions alone will see transport's share of total emissions grow quickly. As MOV3MENT's analysis of national greenhouse gas projections shows below, growth in emissions from passenger cars may be plateauing, but emissions from trucks continued to accelerate through the pandemic. They will only **rise further in the years ahead** as the freight task grows another 35% by 2040.



Truck emissions are heading in the wrong direction

Commercially, the transport sector can no longer resist calls from higher up the supply chain for rapid decarbonisation. Two-thirds of ASX200 companies now have some form of emissions targets in place with half of them committed to net zero. This is even before the introduction of the Australian Sustainability Reporting Standard from 2025. As the 'low-hanging fruit' of Scope 1 and Scope 2 emissions are addressed, **Scope 3 emissions are increasingly the focus of corporate decarbonisation**.

This directly impacts the freight sector; Scope 3 emissions from passenger transport can easily be accelerated (e.g. via consumer demand measures) but road freight and logistics are dominated by small and micro businesses that have no plan or capacity to tackle this looming challenge.

This places Australia's transport sector in a paradox: the shift to cleaner transport is already locked-in but the industry itself is not ready. Decarbonisation may be **the single biggest disruption to the transport system in over 100 years.** An unmanaged transition represents a major risk to the Australian economy and the strength of its supply chains. The country needs a comprehensive plan for how to do this in a responsible, cost-effective way. This paper provides a compass for that plan – laying out an ambitious but realistic challenge to get road transport on course to meeting our targets.

How to Reduce Transport Emissions

Understanding how transport emissions are generated is critical to reducing them:

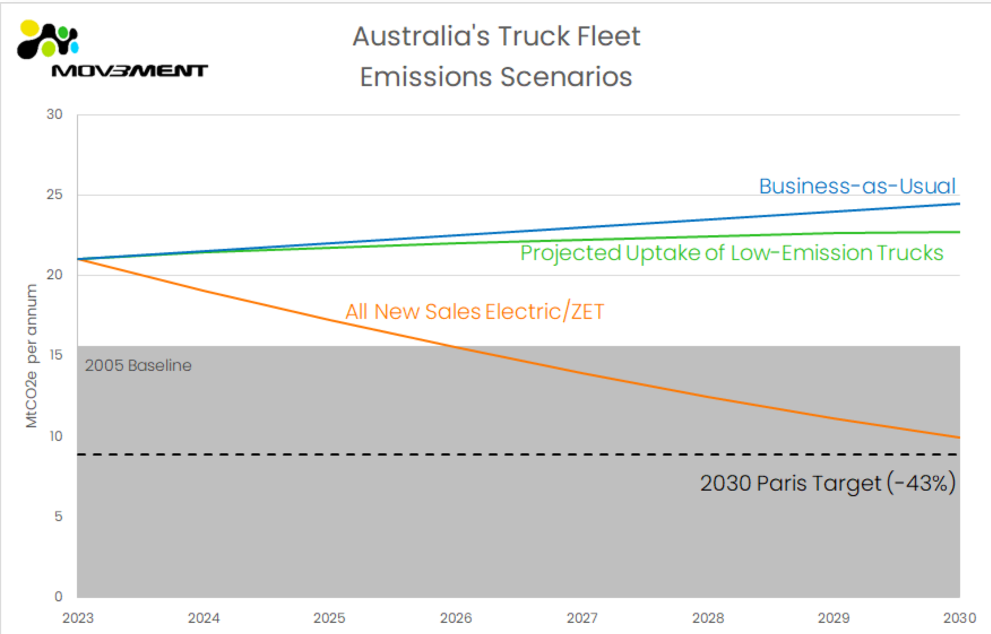
Emissions* = *distance driven* × *vehicle fuel efficiency* × *fuel emissions intensity

Reducing transport emissions therefore needs actions in these same areas: driving fewer kilometres (or carrying more every kilometre), improving fuel economy, and switching energy sources or fuels. Focussing on one area is not enough: the urgency of the challenge requires simultaneous improvements in all areas both at fleet level and more broadly in the transport network, as indicated in a few examples below.

	distance driven ↓ ×	*vehicle fuel efficiency* ↑ ×	*fuel emissions intensity* ↓
Policies:			
	Shift to rail *Freight consolidation centres*	*Vehicle efficiency standards* *Ratings/labels* *Night deliveries*	*Alternative fuel incentives* *Renewable fuel standard* *EV charging infrastructure*
Fleets:			
Cars	*Work from home*	*Carpooling/rideshare*	*EV (home charging)*
LCVs	*Route optimisation*	*Load consolidation, hybrids*	*EV (enroute/depot)*
trucks	*Backloading, HPVs*	*Fuel efficiency, hybrids*	*EV, renewable diesel*

To date, both government and industry have focussed overwhelmingly on the last of these factors, with uptake of zero-emission vehicles (ZEVs) garnering most investment and policy support. However, there is **no credible path to zero emissions without improving fuel efficiency and vehicle productivity**.

In the case of trucks, relying on new sales to decarbonise the fleet will be far too slow. Not only are new trucks just a small proportion of the on-road fleet, but *low-emission* trucks are just a small proportion of that small proportion. The below graph shows how even a significant increase in ZEVs (green line) will not overcome the business-as-usual growth in emissions from an increasing freight task (blue line):



New truck sales alone will not be enough

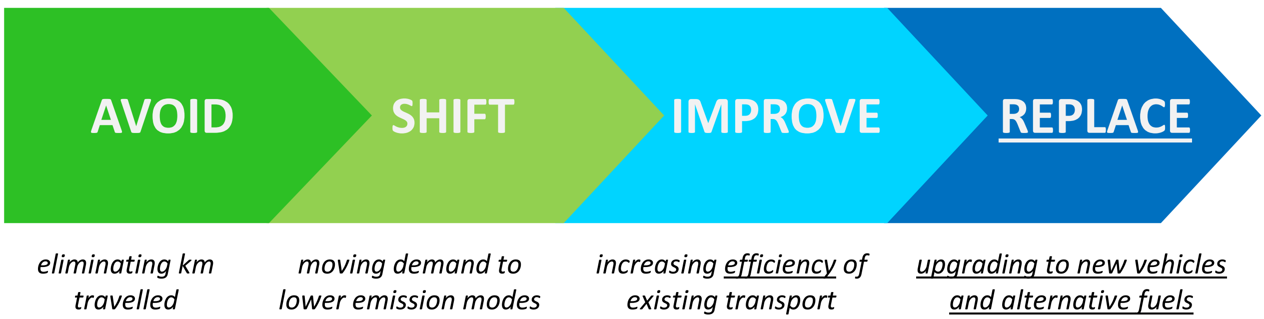
With trucks staying on the road for over 25 years and 80% of new truck sales still expected to be diesel in 2030, nearly the entire truck parc (up to 97%) will still be producing emissions. **Even if *all* new truck sales were ZEVs from 2023 onward, road freight emissions would still not fall fast enough** to reach Australia's economy-wide Paris target (orange line). If road freight does not contribute its fair share of emissions reduction, other sectors will need to over-achieve to compensate.

To deliver material levels of decarbonisation in the near-term, governments must recognise this reality and take specific actions directed at **improving the fuel efficiency and emissions of the *entire* vehicle fleet**, not just new trucks. Reducing fuel use with energy productivity – "doing more with less" – is the most cost-effective abatement option for transport operators. These savings reduce cost-of-living pressure on motorists and go straight to the bottom line for fleet operators.

For these reasons, MOV3MENT recommends embedding this distinction in the popular '**Avoid-Shift-Improve**' hierarchy. While the framework is conceptually beneficial, it suffers from two main drawbacks:

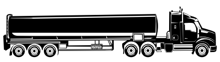
1. Policies to "**avoid**" or "**shift**" trips largely require long-term changes to urban structure, settlement patterns, or transit networks. Despite decades of investment and policy effort, Australia has made only limited progress in managing demand and mode-shifting. For emissions reduction in the 'decisive decade' before 2030, we are largely stuck with the road-dependent transport patterns we have today.
2. Current "**improve**" policies overwhelmingly focus on ZEV sales at the expense of improving how the current fleet operates. For long-lived assets like trucks, this is insufficient. Better fuel efficiency offers one of the only pathways to cut emissions from legacy vehicles already on Australian roads. There is no credible pathway to net zero without it.

MOV3MENT urges policymakers, industry leaders, and researchers to clearly distinguish the efficiency opportunity as a guiding principle for transport decarbonisation. MOV3MENT recommends focusing 'Improve' policies on the current fleet and adding a 'Replace' category focused on fleet turnover as follows:



Our Call to Action: A 25% Reduction by 2030

Road transport is not decarbonising fast enough. But the current trajectory is not fixed and can be influenced with effective policies. Knowing what is realistically possible with current technologies and practices gives us something to aim for, and addressing barriers to improvement provides a path to make it happen. MOV3MENT's experience and knowledge of the vehicle market shows what can be realistically achieved with existing technology. Combining improvements from the pathways below could achieve around 25% reduction in road transport emissions by 2030, relative to today's levels.

Segment	Contributing measures	Emissions reduction by 2030 (after activity growth)
 ***Light Vehicles***	Efficiency & electrification combined (NVES) 19% Renewable fuel 10% Network/mode shift 2%	**-23%**
  ***Heavy Vehicles***	Efficiency 13% Electrification 7% Renewable fuel 10% Network/mode shift 5%	**-26%**

Overseas markets, and some Australian fleets, show us this level of improvement is already achievable using technologies that are operationally practical and financially viable today. The challenge is **to now scale them across the sector**. If every fleet in Australia adopted the modest targets above, the overall 25% target would be easily achieved.

Other factors also indicate these targets can be met:

- Some fleets (light and heavy vehicles) are well ahead of those targets even today – 5 years early!
- EV car sales are more than 5 years ahead of government projections from 2022, and still 2 years ahead of the updated projections released 6 months ago. This is even without the New Vehicle Efficiency Standard so future emissions will likely be lower than currently projected.

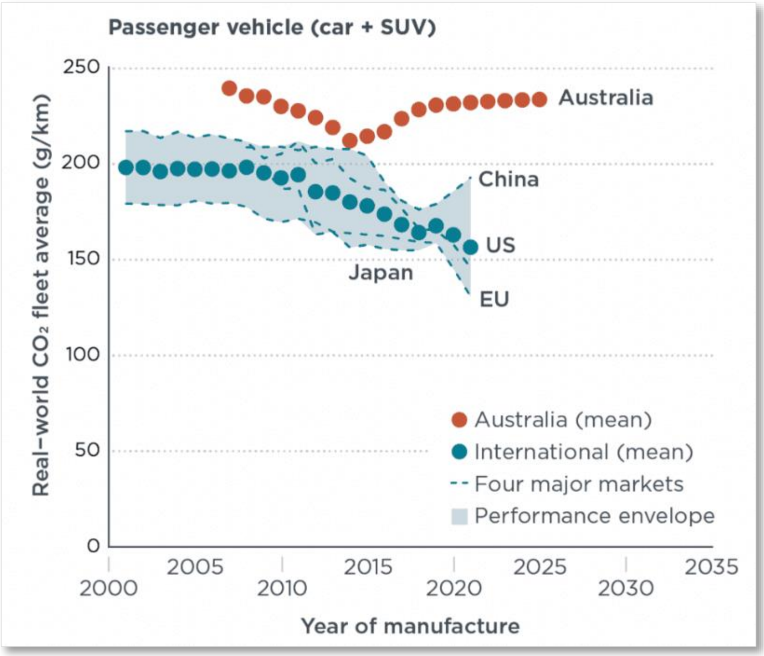
In fact, 40% emissions reduction is potentially achievable if announced battery breakthroughs are commercialised quickly, if fleets embrace efficiency more ambitiously, and if more renewable fuels are supplied. That's why we're calling on every transport user, provider, and policymaker to **adopt the challenge of a 25% reduction in road transport emissions by 2030**. It's not just achievable, it's necessary.

Is This Realistic and Achievable?

In short, yes. But it needs specific, targeted action. 'Transport' is not a homogenous sector, with diverse and complex differences depending on vehicle type and activity. Tailoring actions and policies to each segment (even sub-segments) is critical to achieving cost-effective and fast decarbonisation.

For light vehicles

Since passenger cars, SUVs, and light commercial vehicles (e.g. utes, vans) make up almost 60% of total transport emissions, this segment offers the single biggest decarbonisation opportunity. The International Council on Clean Transportation estimates that emissions from new cars and SUVs in Australia are up to 50% higher than the global average (see graph).



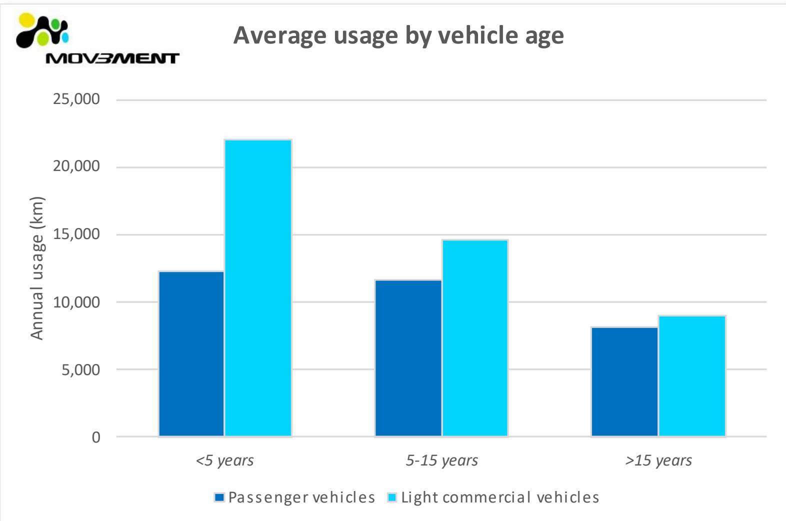
Real-world emissions are stalling in Australia (ICCT, 2024)

The pathway for long-term emissions reductions in this sector is already clear: it is battery electric vehicles (BEVs). In several segments, **BEVs are already cheaper than petrol and diesel cars** when assessed on total cost of ownership and retail prices are already coming down as competition increases.

However, in some popular segments there are no competitive or cost-effective models yet available. For this reason, hybrid vehicles will continue to play a significant role in the short/medium term until more BEV models are introduced.

Yet even without vehicle CO_2 standards, Australia has managed to achieve an EV sales share of 8%. This is almost unique in the world, demonstrating strong demand for EVs among buyers, many more of whom are still waiting for greater model coverage and price reductions.

Introducing the New Vehicle Efficiency Standard (NVES) from 2025 will accelerate both fuel efficiency and EV adoption, such that the Australian Government expects the average emissions intensity of new vehicles to drop by 50-60% (for LCVs and passenger cars, respectively). This would be a significant improvement on its own but the benefits are compounded by the higher mileage of new vehicles, which are used more intensively than older vehicles. As this chart shows, newer LCVs are driven almost 50% further on average than decade-old LCVs, and twice as far as the average LCV more than 15 years old. The average new LCV is also driven almost twice as far as a new passenger car, so any incentives that specifically encourage faster transition of LCVs will be more effective at driving down emissions.



Newer vehicles consumer more fuel than older vehicles

Apart from the NVES, any policy measures to increase EV uptake via widespread public charging and purchase incentives, could transition the fleet even faster (see recommendations).

Of course, there will still be millions of petrol and diesel vehicles on Australian roads in 2030, and for many years after that. **All those vehicles could be decarbonised to some extent if they were powered by renewable fuels** – ethanol, biodiesel or renewable diesel. To achieve that, we suggest a mandated 10% blend ratio such that all fuel sold in Australia from 2030 have at least 10% renewable content: E10 for petrol and B10 or R10 for diesel. This could reduce emissions from all the on-road fleet by roughly 10%.

Is this possible? We only need to look overseas to see that many countries have mandated or achieved similar or even greater uptake of ethanol and/or biodiesel in their national fuel mix: Angola (10%), Argentina (10%), Brazil (25%), China (10%), Costa Rica (20%), EU (10%), Indonesia (10%), Philippines (10%), Zimbabwe (10%). Mandating renewable fuels is not a radical idea. With its vast area and strong economic position, is it really the case that Australia cannot do what these other countries have done?

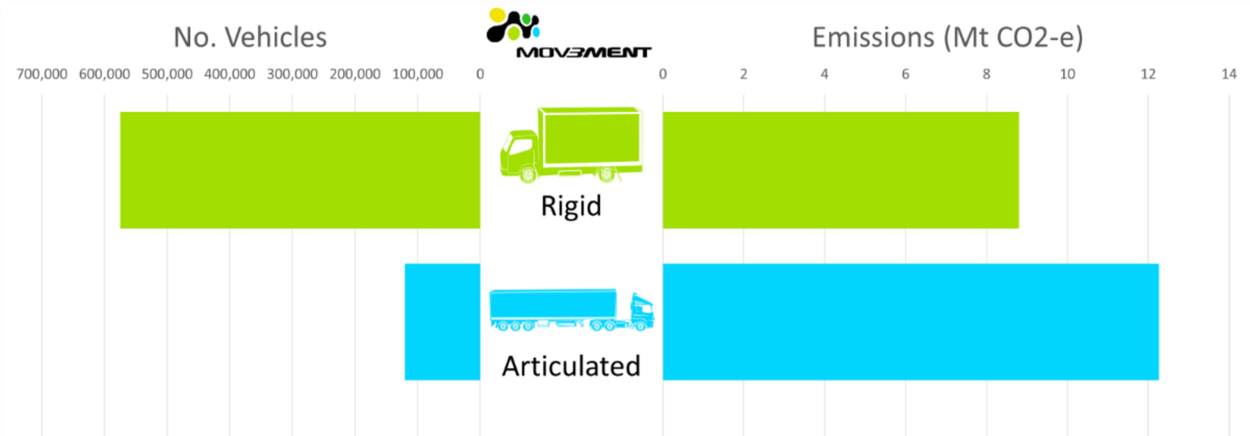
Over the long term, a concerted effort to shift more car trips to active or public transport could further reduce emissions by an estimated 5%. This relatively modest improvement could be achieved by incentivising commuters onto public transport, increasing service frequencies, excluding employer-subsidised bikes and travel cards from fringe benefit tax, and additional infrastructure funding to expand coverage of the transit network.

Combined, these realistic and cost-effective measures could collectively reduce light vehicle emissions by an aggregate 40% or more.

For trucks

In individual supply chains, there is significant uncertainty as to the best alternative energy pathway to pursue. Increasing emissions from trucks are partly explained by the low adoption rate of alternative fuels and advanced powertrains in the Australian truck market. All options currently add costs compared with diesel, but the transition will have differential risks and impacts.

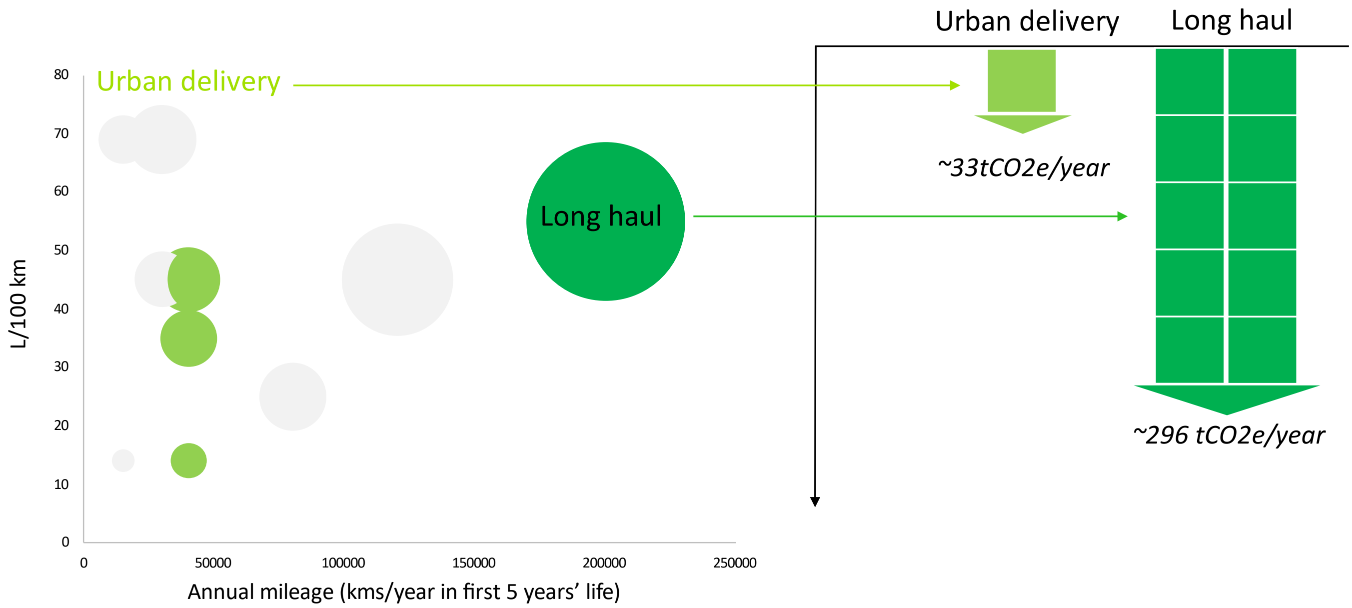
There are around 700,000 trucks registered in Australia, with about five times as many rigids as articulated trucks. Despite being fewer in number, articulated trucks on average have higher fuel consumption and drive further, so they collectively produce around one third more emissions than all rigid trucks combined.



Vehicles vs emissions in Australia's truck fleet

Newer trucks are also used more intensively than older trucks. ABS data indicates the average near-new articulated truck (less than 5 years old) drives almost twice as far each year middle aged trucks (5-15 years) and around 6 times further than the oldest articulated trucks (more than 15 years old).

Combining the higher utilisation and typical fuel economy of an articulated truck in interstate linehaul, shows it can have 9 times the emissions impact of a smaller rigid truck doing urban distribution:



Annual diesel consumption by duty cycle **Emissions reduction potential (per vehicle)**

This data points to a new area of focus for industry and policymakers: in addition to electrifying urban trucks, support is more effectively directed towards decarbonising the big hitters of the freight task. This is a much smaller cohort: semi-trailers and B-Doubles operating on just a few main freight routes, particularly the east coast highways.

There are already electric trucks in Australia today that can drive approx. 450km in semi-trailer configuration before needing to recharge. Models available overseas have achieved 750km between charges and driven more than 1700km in a day. These models cannot cover the full spectrum of Australian applications or the hardest operational requirements in terms of trip time or payload. But **they would suit a large proportion of inter-capital city shipments** that are not mass constrained. And with technology developing rapidly, the next generation of battery powered trucks will deliver even better capability.

Investing in the infrastructure (e.g. heavy vehicle chargers, roads upgrades, bridges) that could support more of these trucks, and de-risking the transition cost for early movers, will achieve greater and faster decarbonisation, **contributing a 7% reduction in total truck emissions by 2030**.

Irrespective of the specific pathway chosen (e.g. electrification, renewable fuels, or both), **doing *something* for this trucking segment is paramount**. Applying a similar blending mandate using 10% biodiesel/renewable diesel, would allow those trucks that cannot reasonably be electrified to reduce emissions without significant upfront investment or major operational changes.

These are material considerations given the structure of the industry and operator capabilities. The largest transport fleets face tightening regulatory pressure (e.g. Safeguard Mechanism, Australian Sustainability Reporting Standards) but they also have access to the finance necessary to respond. On the other hand, around 98% of truck operators are small/medium businesses; 70% own just one truck.

Owner-operators and small businesses have limited ability to finance the transition to low-emission freight. For them, **an unsupported transition to net zero represents an existential threat**.

For these operators, **fuel efficiency is a more cost-effective path toward decarbonisation**. It is also a message more likely to resonate: achieving emissions reductions while simultaneously reducing costs and building business resilience. Quick wins in fuel efficiency also foster a greater focus on data, build momentum for bigger changes, and can prepare small fleets for a future with electric trucks. MOV3MENT's experience with truck fleets of all sizes indicates that fuel efficiency opportunities (such as those below) are not well understood:

Potential fuel efficiency improvements for existing trucks

This potential is backed up by overseas experience. In the USA (where fuel efficiency regulations were introduced in 2014), a 25% improvement in fuel economy over 5 years has been seen for semi-trailers. A second phase will boost the aggregate improvement to around 40% (ICCT 2015). Similarly, the World Road Transport Organisation claims that **efficiency is both more effective and cheaper than both electrification and hydrogen** in making the sector carbon neutral by 2050. It claims efficiency could contribute 51% of the EU's targeted emissions reduction, even with today's technologies (IRU 2023).

Australian experience suggests **most fleets can find 10-15% fuel savings** (and commensurate emissions reductions) through a combination of simple and cost-effective improvements, if they had more guidance and information on suitable products. Driver training alone can generate up to 20% savings in some fleets. Information and education resources such as NatRoad's *Get Fleet Fit* initiative (developed with MOV3MENT) are crucial to raising awareness among operators. But more needs to be done to increase both confidence in fuel savings technologies and their availability in the market.

Overall, we have assumed **a conservative 13% potential emissions saving** across the entire truck parc using a combination of retrofit technologies and improved fleet practices.

Network-related opportunities that optimise logistics can also contribute significant emissions savings. These measures result in driving less or carrying more freight and include:

- co-location or consolidation of facilities,
- Higher-Productivity Vehicles (HPVs) which can reduce the number of truck movements by 30% or more
- Shifting to lower emissions intensity modes (e.g. rail or maritime freight).

Many such opportunities relate to specific companies, routes or commodities, so scalability may not always be feasible. For this reason, a **conservative 5% emissions reduction** is assumed for this pathway.

Role of Government and Policy

Road transport is not decarbonising fast enough. To date, this has been an area of policy failure but government alone cannot achieve the scale and speed of change required to decarbonise the sector – working with industry is crucial. As a highly regulated and taxed sector, there is a clear role for government – indeed an obligation – to level the playing field, address market failures, and incentivise cleaner options. The levers available to government are well known, and the International Energy Agency has for decades urged governments to influence energy users via a combination of three linked mechanisms:

1. Strong regulations and standards
2. Financial and fiscal incentives and disincentives
3. Independent, trusted information

Governments are typically reluctant to act in the first category. But the lived experience of high CO_2 emissions from Australian passenger cars – which, unlike nearly every other major car market, have not previously been regulated in Australia – serves as a stark reminder of the critical role that regulation plays.

Charting a smooth decarbonisation path in transport also means **being realistic about how the transition can scale**. That's why MOV3MENT's advice is based on a suite of key principles reflecting market realities informed by decades of practical decarbonisation experience:

- Decarbonisation should focus on the objective (reducing CO_2) not on a shiny, new technologies
- The biggest and/or fastest decarbonisation pathways should be priorities (i.e. legacy fleet)
- Externality costs and co-benefits need to be included to encourage behaviour change
- Industry will only adopt decarbonisation opportunities at scale when required to (by customers or by government) OR when the opportunities:
    - are financially beneficial
    - can do the job without significant operational compromise
    - have clear and certain benefits
- Prices do not always (or often) reflect technology costs; suppliers charge what customers will pay
- Ad-hoc, short-term action by government is almost always insufficient to drive change
- Easy wins (e.g. efficiency) can also educate, demonstrate, and build foundations for change.

Other markets show that **the time for research is over**. The technology and fuels needed to decarbonise transport are ready and have been known for more than a decade. The challenge now is commercial: lowering the cost and building certainty and industry confidence to adopt at scale.

Recommended Priority Actions

Accounting for the issues above and the differing responsibilities of federal, state, and local policymakers, decisive and simultaneous policy actions are needed to achieve short term emissions reductions and a long-term transition to net zero. To decarbonise the movement of people and goods in line with Australia's targets, MOV3MENT recommends prioritising the following 10 policy interventions.

Light Duty Vehicles

1. Strong penalties & enforcement of the NVES fuel efficiency standard

The rate of reduction required by the NVES appears to be well judged, sitting at the ambitious end of annual improvements seen overseas. More importantly, it is **the monitoring and compliance mechanism that will likely determine the effectiveness of the scheme**. Concretely, this means the stringency of fines, fees or other penalties for non-compliance with NVES targets. In the past, many global OEMs did not send EV models to Australia precisely because the revenue on a sale here was outweighed by strong penalties in regulated markets overseas. Weak penalties in the NVES enforcement mechanism could drive a similar behaviour amongst local importers weighing the incremental revenue for non-compliance against the size of any penalty. MOV3MENT urges government to be equally ambitious in setting and enforcing penalties for non-compliance as it has been in setting the upcoming targets.

2. Support workplace charging for EVs

The vast majority of EV charging in Australia occurs at home. To build confidence in the technology, significant government funding has been provided to build DC fast-charging and this continues to roll out at scale and pace. In contrast, *workplace* EV charging has received little government support.

MOV3MENT has worked with dozens of businesses, government agencies, and local councils on their EV transitions and consistently finds that **workplace charging is a significant missed opportunity for EV uptake**. While some states offer support to instal charging for fleet vehicles, this does not usually extend to charging personal vehicles at work. Yet car travel to/from work is high in Australia, providing a perfect dwell time to charge employee vehicles as they sit idle throughout the day.

Rather than pouring ever-more funding into fast and ultrafast DC charging, there is a massive opportunity to focus on **low cost, high impact, high patronage charging deployments matched to dwell times** at workplaces, universities, parking garages, and other places where people park. A national workplace charging program would be highly cost-effective. This would have a triple-benefit of supporting charging where vehicles dwell for long periods; "soaking" vehicles during the peak solar production period and imposing far lower costs on individual charging locations. DC fast charging units can be $100,000 for the equipment and the same again to install if there are site constraints. In contrast, slow AC charging at workplaces can be less than $2,000 per unit.

MOV3MENT recommends future government investment prioritises small-medium enterprises to "future-proof" their workplaces with tailored, cost-effective EV charging equipment, noting that most businesses won't require DC charging or expensive electrical upgrades. To smooth the transition and improve transparency, we also recommend future investment be tied to data sharing and reliability/uptime targets.

3. Link EV incentives with renewable energy

Electric vehicles can only be truly zero-emissions if charged with electricity sourced from renewable energy. While the Australian grid is slowly decarbonising year on year, accelerating emissions reduction in the light vehicle fleet should give due regard to Scope 2 emissions underpinning its transition.

To maximise decarbonisation in Australia's light vehicle fleet, MOV3MENT recommends **future government incentives for EVs be linked to renewable energy generation**. Detailed policy design could include requiring Green Power Purchase Agreements or including mandatory criteria for renewable energy certificates, or a link to the Federal Government's flagged Certificate of Origin scheme for various fuels. Making EV subsidies conditional on renewable energy would be a novel way of ensuring the emissions abatement in the transport sector does not unintentionally increase emissions in other sectors.

Heavy Duty Vehicles

4. Easier access to greater grant funding for low emission trucks

Today, the price of a battery electric truck can be 2-3 times the price of an equivalent diesel truck. For a hydrogen fuel cell truck, the price is often 4 times a diesel truck or more. In many cases, the lower operating costs for EVs are either not enough to overcome the upfront premium, or buyers cannot access the additional capital required to transition their fleet. Without financial support, high costs will continue to slow emissions reduction.

At this early stage of the transition, one of the most effective policy levers to increase uptake of low-emission trucks would be some form of **subsidy supporting purchase of these trucks**. Government incentives that either **bridge the price gap or partially subsidise the cost premium** have been successfully deployed worldwide.

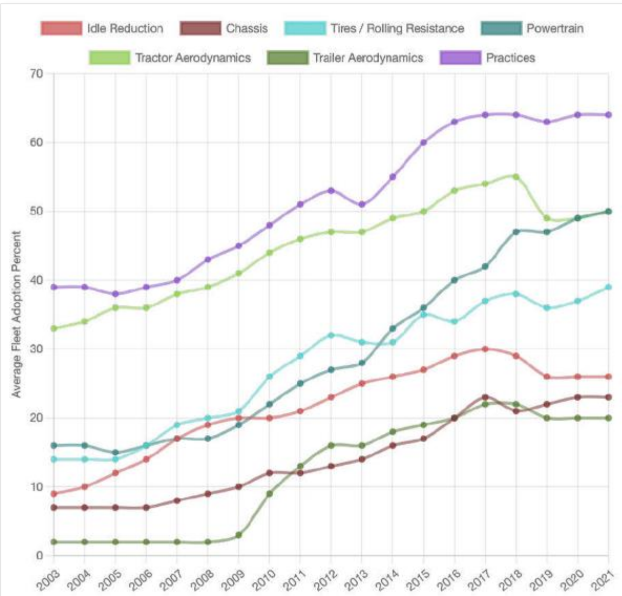
In Australia, governments have provided significant financial support to *passenger* vehicle EV purchasers. MOV3MENT therefore strongly advocates for at least a commensurate level of government support for trucks – evidently a harder-to-abate transport mode.

Crucially, such funds must be more accessible. Applicants report that even the limited government support that is available (e.g. ARENA) is complex, time-consuming and favours only large fleets initiatives. More needs to be done **to simplify access to government funding, particularly for smaller operators**. This could be via a voucher scheme (per California's successful model), a contestable fund (as in New Zealand), or any number of grants and rebate models used in Europe.

5. Trials & technology verification program

Reducing emissions requires an understanding of the options available, their costs/benefits, and how to analyse and implement the options to maximise benefits. A lack of concise information, credible advice on real-world benefits, low confidence in technology, lack of support, poor data foundations, and limited time for research, all prevent everyday operators from reducing their emissions. So long as this remains the case, emissions in the on-road fleet will remain high.

A successful overseas approach is government support for a **dedicated demonstration/verification program for technologies that can cut emissions**. Such trials should not be limited to zero emission *vehicles*; cutting trucking emissions will require *equipment* fitted to legacy vehicles as well. Many opportunities, components, practices and after-market devices to improve fuel efficiency have not been broadly adopted by Australian transport operators, as noted earlier.



Adoption percent by technology category (c/o NACFE)

In contrast, the North American Council for Freight Efficiency (NACFE) has been tracking uptake of fuel-efficient technologies in a sample of the US fleet for two decades. The graph at left highlights how promoting these emissions-saving options through 'green freight programs' like Smartway can drive adoption in existing fleets that would otherwise be unable to reduce their carbon footprint.

At the time of writing, there were no comparable programs underway federally or in any State/Territory in Australia.

6. Enroute electric charging infrastructure for trucks

State and federal governments have already supported the beginnings of a Hume Hydrogen Highway refuelling network on the east coast, despite a lack of available hydrogen truck models and few current commercial advantages over the latest battery-electric models. It is already clear **electrification and battery-power will be a solution** for many truck applications; but there is no apparent investment in an equivalent charging network for electric trucks as there is for hydrogen.

Decarbonising one articulated truck in long haul operations can deliver 9 times the abatement of decarbonising smaller urban delivery trucks. But these articulated trucks are less likely to return to the same depot each day or to have significant dwell time for daytime or overnight charging. Therefore, their ability to conveniently access ultrafast charging on urban, regional and interstate highways is a critical foundation needed to leverage their greater potential.

Australia is uniquely positioned to benefit enormously from electrified road freight thanks to our low-cost renewable energy resources and concentrated freight networks. Government planning and incentives for the development of a network of highway charging infrastructure – in concert with other supportive policies – are required for OEMs to bring electric truck models to Australia and for freight operators to have the confidence to invest in electric alternatives. It is not a new concept – Australian governments are enthusiastically doing this for light vehicle charging, as noted earlier. But **to-date, there seems to be little appetite to support an equivalent network for trucks**.

Potential electric freight recharging network in Australia (Image: NewVolt, 2024)

To be clear, this is not picking electric trucks as the technology winner: if anything, it is more like levelling the playing field. Australian governments have been quick to embrace the potential of hydrogen as a transport fuel and have committed significant funds to developing refuelling locations. But MOV3MENT's independent analysis (among others outside the hydrogen industry) shows its likely contribution to supply chains will be limited in the near-term and likely uncompetitive in the longer term.

MOV3MENT urges government to implement **the principle of 'neutrality' to facilitate all promising technology options**, not some at the expense of others. With barely 25 years to decarbonise Australian freight, governments and investors cannot afford to back the wrong horse.

7. Trusted Information and Tools

Various information failures have stifled decarbonisation of freight transport. Energy analysis and fuel switching is more complex than in other sectors, and there are significant gaps in trusted information and data. As a result, **awareness of efficiency improvements is generally quite low**, leading to poor decisions or delayed action. Government and industry must work together to ensure operators better understand how to reduce their energy use, costs, and emissions.

This approach is not new. Disseminating the findings of research, trials, projects, and events is a key part of facilitating industry change. Efficiency must be a core early focus of that process, engaging small and medium sized fleets not just the well-resourced Tier-1 fleets. This has been done successfully in overseas initiatives such as Smartway (USA), Zemo Partnership (UK), Objectif CO2 (France), and NACFE (USA). All provide **independent, trusted information for fleets to use in their decision making**, be it technology assessments, verification programs, reports, videos, factsheets or calculation tools. The design of information programs and other support measures is already well understood. MOV3MENT has benchmarked overseas initiatives and would gladly provide more specific information on request.

Any such initiative in Australia needs to recognise our different starting point. We use different trucks in different conditions, and some equipment technologies used overseas may have limited availability here. Simply using overseas information is neither credible nor advisable.

An approach tailored to the *Australian* market should address the information barriers faced by *Australian* operators. For example, **there is no simple way to compare the fuel economy of two similar trucks** sitting on the showroom floor or the effect that different equipment will have on a truck's fuel economy.

Overseas, this challenge has been partially addressed by equipment ratings (e.g. tyre economy labels), technology accreditation, or fleet recognition schemes. In Australia, other sectors have also developed efficiency labels or green accreditations. Buildings, appliances, foods, hotels and restaurants all use the simple concept of star ratings to guide purchasing decisions toward preferable products. For passenger cars, MOV3MENT worked with the NSW government to develop and launch a new [national vehicle emissions star rating](), which has been well received by industry, fleets and motorists.

International examples of truck accreditation schemes

For heavy vehicles, an equivalent green star rating has not yet been ratified, but one does exist, developed by MOV3MENT and piloted with support for government in 2020. It is technology neutral, future proofed (hybrids, BEV, hydrogen), and can be used to assess and compare trucks – including used trucks – while also educating buyers. This broad applicability is key to the scheme's decarbonisation potential as it does not rely on the slow adoption of ZEV technology in new truck sales.

This concept was included in the first National Action Plan of Australian National Freight and Supply Chain Strategy, and the concept adopted in the NSW Net Zero freight strategy. It should now be quickly finalised and implemented to help operators better understand efficiency and emissions, and to guide their purchasing decisions toward lower emission trucks and equipment.

8. Subsidised fleet assessments to identify cost/efficiency improvements

Government routinely delivers programs to support consumers, companies, and entire sectors improve energy efficiency and decarbonise their 'energy' use. The buildings sector, major industrial firms, and commercial energy users have all benefited from dedicated grants and funding programs to assist businesses to shrink their energy bill. These programs often include independent experts conducting site energy audits and opportunity assessments to identify areas for improvement and cost savings. But **nothing equivalent exists for the transport sector, despite it already being the biggest user of primary energy in Australia**, and likely the biggest source of emissions by 2030. Indeed, transport activity and fuels are often explicitly excluded from the scope of such programs.

Consistent with the Avoid-Shift-Improve(-Replace) framework, it is by doing more with less that some of the largest emissions reductions can be realised. A government initiative to fund and/or subsidise expert advice for freight fleets is sorely needed, helping them to better understand their energy use and identify energy productivity opportunities. This should include support/funding to *implement* opportunities too.

MOV3MENT has delivered subsidised fleet assessments in NSW, Victoria, Tasmania and Queensland but these have been ad-hoc ad lacked long-term funding. A model exists for delivering such a program, but it will require sustained government support and industry involvement.

Additional Measures

9. Low Carbon Liquid Fuels Mandate and funding

Successfully **integrating policies for low carbon liquid fuels may be the most decisive factor for freight decarbonisation in Australia.** MOV3MENT's modelled scenarios for low-emission technologies have found that even with the most optimistic uptake assumptions for ZEVs, there will be a persistent demand for high volumes of drop-in renewable fuels – a fact often overlooked in the rush to embrace new vehicle technologies. Sustainable liquid fuels can play an important bridging role, accelerating the transition across the existing fleet until technology advancement and fleet replacement occurs. Use of sustainable liquid fuels will then likely reduce over the long term.

Sustainable liquid fuels should be 'drop in' so that they can be used without engine modifications, which may imply limiting blend proportions with diesel. This would provide the greatest potential impact through broad scalability across existing assets.

The most promising low carbon liquid fuels for transport decarbonisation are listed below in order of scalability and viability:

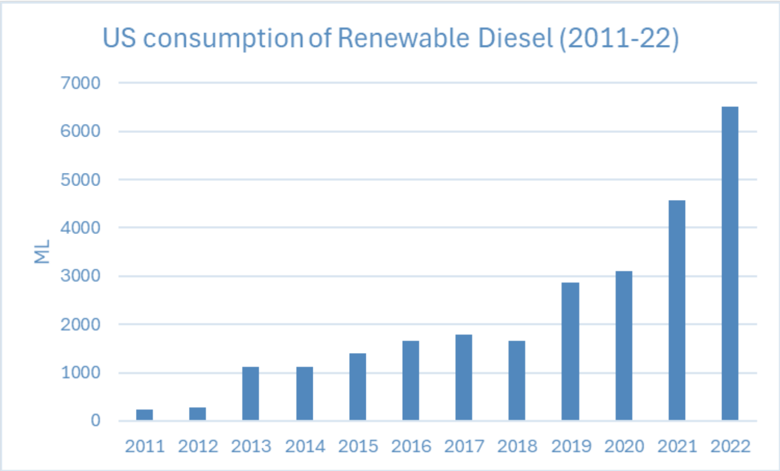
Renewable diesel (e.g. HVO)	**Medium-long term fuel** *Broad suitability with zero changes required to operations makes it highly appealing to fleets (no new truck technology or fuel storage needed), with up to a 90% reduction in lifecycle GHG emissions. Higher costs will result in market share encroachment from battery-electric trucks as total cost of ownership becomes competitive in more segments.*
Biodiesel blends (B5, B20, etc.)	**Transition fuel** *Only acceptable at lower blend rates as most engines cannot accept more than 20% blend with diesel (B20) without invalidating engine warranty or changes to fuel system/engine. Despite decades of investment, biodiesel remains approx. $1/L more expensive than diesel. Used cooking oil and tallow provide most non-food crop feedstocks but are limited in supply; non-food feedstock technologies need to be commercialised to expand production.*
Ethanol-blended fuels (E10, E85 etc.)	**Transition fuel** *Only acceptable at lower blend rates. Higher blend rates requiring engine conversions will remain uneconomic. Lifecycle GHG emissions savings may not meet definition if GHG emission reduction is less than 50%. To date, the major end user for ethanol has been passenger vehicles, which are also the fastest to electrify.*
Synthetic fuels	**Long-term fuel** *Synthetic or 'e-fuels' could technically provide a long-term sustainable fuel but cost to produce green hydrogen and capture CO_2 is likely to make them prohibitively expensive.*

Cost and availability represent the most fundamental barriers to uptake of drop-in renewable fuels. **Governments should support availability of sustainable liquid fuels by introducing mandatory blending limits** aligned to sectoral emission targets. Along with other measures, this could initially stop the current drain of feedstocks being exported *from* Australia to other markets that do have mandates. The blending percentages themselves should be co-designed in close collaboration with industry, but MOV3MENT **recommends starting at a minimum blend ratio of 10%** – a relatively achievable level that does not require any significant modifications to existing diesel vehicles (new or old), but which would still have a material impact on emissions if applied across the truck parc. The ratio should be reviewed and adjusted as supply, demand, and decarbonisation require.

Securing enough fuel supply for this mandate will be challenging. Significant investment to (re)establish local production will be required even as international demand is already directing offshore most of

Australia's raw biomass feedstock (e.g. canola, tallow and used cooked oil). The EU's and USA's regulated blending requirements will only increase global demand for these feedstocks, and trucking will also face demand competition from maritime and aviation.

Government support for refining capacity should therefore be actively considered as part of broader fuel and energy strategies. This has additional benefits in creating jobs, a potential new export industry and improved energy self-sufficiency and security (compared to almost 100% imports of fossil diesel today). The scale of the challenge is significant, but it has been done before. Within the space of a decade, the US went from zero renewable diesel to producing enough each year to power almost the entire Australian truck fleet – 6,500 ML (see graph). Even with a 10% blending mandate, Australia would only require 10% of this volume.



The 'carrot' to the 'stick' of fuel blending mandates should therefore be tax offsets, accelerated depreciation, duty reduction or other incentives to support onshore *production* of low carbon drop-in fuels. Extending the fuel tax credit to certified low carbon liquid fuels (e.g. renewable diesel, biodiesel blends above B20) would also fix a current gap. Upfront incentives/grants to install additional refuelling infrastructure may also be targeted to support early adopters.

Supporting the production side is more effective with complementary demand measures. A mechanism to reward and recognise the use of renewable fuels by fleets – through some combination of a carbon pricing mechanism, certificate scheme, or accreditation – would also go some way to driving up demand by operators. This would also signal their importance of decarbonising the sector, starting with mandatory use of renewable fuels in government fleet.

10. Clean air zones with either restricted access or differentiated fees

Apart from their climate impact, the community also bears the cost of an ageing truck fleet through illness and health costs. A joint study by Asthma Australia and the Electric Vehicle Council found air pollution from vehicles kills over 1,700 Australians per year. Internalising those costs via **policies to renew an ageing fleet** could support the adoption of zero-emissions technology.

Differentiated access for zero emission vehicles is one proven method for accelerating fleet turnover overseas. Access concession such as allowing night-time delivery, toll amnesties, special use lanes, and preferential access/fees at freight precincts (ports, intermodal terminals, etc) would all recognise the benefits of low emission vehicles.

Another popular precedent internationally has been the establishment of Low or Zero Emission Zones in major urban centres. Typically imposed at metropolitan or local government level, the zones regulate *access* to a specific geographical area and have been successfully paired with ZEV purchase incentives abroad. For example, London's well-known Ultra-Low Emission Zone (ULEZ) has been accompanied by a scrappage scheme to compensate for the de facto ban on petrol/diesel vehicles.

Given Australia's highly urbanised population and the almost total reliance on road freight in such areas, the introduction and policy design of any Low Emission Zones or access restrictions must be introduced and designed with utmost care. MOV3MENT recommends any such policies be staged, forecast well in advance and must achieve the support of the road freight industry, ideally via co-design.

ABOUT MOV3MENT

Motor vehicles enable the modern economy but also impose burdens on society. MOV3MENT's mission is to make vehicles part of the solution not the problem. We take complex questions on energy, cost and emissions and simplify them into actionable fleet strategies, policies, and programs.

Our knowledge and advice are built on practical, cost-effective improvements that benefit vehicle operators and the community, with a particular focus on truck and bus operators, suppliers, and policymakers.

We leverage this knowledge to help governments develop programs and policies that overcome barriers to improvement, demonstrate real-world benefits, and increase awareness and knowledge. This includes innovation projects that use information to transform the market – like our world-first Smart Truck Rating.

We're fiercely proud of the things that set us apart: our independence, our principled approach, and our evidence-based advice.

To accelerate your net zero transition, get in touch via email info@mov3ment.com.au or find out more on our website www.mov3ment.com.au.

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