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# Impacts of Heavy Vehicle Reform: ARENA Response

Australian Government
Australian Renewable Energy Agency

ARENA

# Table of Contents

# Executive Summary

**About ARENA**

ARENA is the Australian Renewable Energy Agency. We were established by the Australian Government on 1 July 2012.

We support the global transition to net zero emissions by accelerating the pace of pre-commercial innovation, to the benefit of Australian consumers, businesses and workers.

Our purpose is to support improvements in the competitiveness and supply of renewable energy and the uptake of energy efficiency and electrification by providing financial assistance and sharing knowledge, to accelerate innovation that benefits all Australians, and facilitates the achievement of Australia's greenhouse gas emissions targets.

Since 2012, we have supported more than 800 projects with over $3 billion in grant funding, unlocking a total investment of almost $15 billion in Australia's renewable energy industry.

**Decarbonising Heavy Vehicles: The Challenge and the Opportunity**

Transport plays a vital role as an enabler of Australia's economy, with demand across transport modes projected to increase across land, air and sea. In the year to June 2025, transport accounted for ~23% of Australia's national emissions[1]. Projections out to 2040 consider only moderate reductions in transport emissions compared to the electricity sector[2].

The Government's 'Transport and Infrastructure Net Zero Roadmap and Action Plan' (Transport Sector Plan) outlines some of the technical and commercial challenges in decarbonising transport. This report recognises that certain use cases have relatively clearer pathways (e.g. light passenger vehicles) but face scaling challenges such as commercial models, infrastructure buildout and consumer perception. Other use cases (e.g. long-distance trucking and aviation) have less certainty on the technological pathway and require additional advancement before becoming viable at scale.

Within the transport sector, heavy vehicles are a material and stubborn source of emissions. Road freight activity is projected to grow by approximately 35% between 2025 and 2040, leading to a 10% (or 2 Mt CO2-e) increase in truck emissions by 2040. Truck emissions are projected to increase through 2035, then flatten with diminishing year-on-year growth before a marginal decline by 2040[3]. As such, further focus from industry and government is required to meet Australia's emissions reduction targets.

The Transport Sector Plan outlines the benefits of taking action to decarbonise the transport sector. This includes consumer savings, fuel security, export opportunities along with health and productivity benefits. Considering the broader global developments in the Heavy Zero Emission Vehicles (HZEV) space (such as declining battery costs, increasing model availability), Australia is well placed to take advantage of these benefits if effective action is taken.

**ARENA's involvement in Decarbonising Heavy Vehicles**

'Decarbonise Transport' is one of ARENA's five strategic priorities[4]. Since 2017, ARENA has committed over $300 million in grant funding towards projects seeking to accelerate the decarbonisation of transport. These projects address key focus areas including the rollout of public charging infrastructure, fleet electrification, innovative charging solutions as well as production and use of low carbon liquid fuels.

ARENA's funding for road vehicle decarbonisation is administered through the Driving the Nation Program. As of December 2025, this funding program is supporting three key focus areas:

- Demonstration and deployment of heavy battery electric vehicles (BEVs)
- Deployment of heavy BEV charging solutions

[1] Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2025 *DCCEEW* (2025), p. 18
[2] Australia's emissions projections 2025 *DCCEEW* (November 2025)
[3] Ibid.
[4] ARENA Investment Plan (2025-26 to 2027-28) *ARENA* (2025)

- Vehicle to grid (V2G) and Innovation.

Under the Driving the Nation Program, ARENA has previously supported several innovative projects that are advancing Australia's capabilities and understanding of the HZEV opportunity. These include:

- Team Global Express, Depot of the Future Vehicle Electrification Project
- Tropic Wings, Sustainable Transport in Tourism
- Patrick Terminals, BEV Terminal Trucks at Fremantle Port
- Centurion, Rigid and Prime Mover Truck Electrification Project
- ANC, Last Mile Delivery EV
- Zenobe, EV Delivery Truck Charging Facility
- Wyndham City Council, Local Council BEV Integration Project
- Linfox, Heavy Truck Electrification Project
- Toll Group, Project Truckvolt
- Mondo Power, Melbourne Electrified Freight Hub

In addition to providing funding for projects, ARENA seeks to draw out portfolio insights to share with the market. Key contributions to the industry this year include:

- Electrifying Road Freight: Pathways to Transition, *AECOM* (2025)
- Insights from Freight Transport Electrification Across Port, Express Parcels & Last-Mile Deliveries, *Energeia* (2025)
- ARENA's Knowledge Bank

We recognise the industry has a wealth of knowledge and insights. Key reports from 2025 that provided novel analysis on heavy vehicles included:

- Electric Truck Report 2025, *Mov3ment*, (2025)
- Securing Australia's net-zero future through clean freight, *Energy Future Foundation*, (2025)
- Accelerating the Transition: Zero-emission commercial vehicles, *Smart Freight Centre & B*NEF (2025)

Based on our experience and those of our project recipients, ARENA seeks to share five key insights with the aim of accelerating the decarbonisation of heavy vehicles. These are:

1. Action is needed to incentivise investment into charging infrastructure and HZEVs
2. Weight limits should be reconsidered to unlock the potential of HZEVs
3. Local road access and permit requirements should be reviewed to reduce complexity for OEM's and fleet operators
4. Curfew restrictions should be eased to unlock potential of HZEVs
5. Australian Design Rules should be revised in their application to HZEVs.

# Key insights

### Key Message 1: Further action is needed to accelerate investment in charging infrastructure and HZEVs

As noted above, Australia has a significant advantage to decarbonise its heavy vehicle sector. Initially, the higher costs of vehicles and refuelling infrastructure present a commercial gap compared to "business as usual". However, we expect that over time:

- the cost of vehicles will continue to fall (as demonstrated in global markets[5]) and the total cost of ownership (TCO) of these vehicles will match (or fall below) its ICE equivalent in many use cases.

[5] Accelerating the Transition: Zero-emission commercial vehicles, Smart Freight Centre & BNEF (2025)

- operators will become more familiar with the requirements of HZEVs, supported by local and global companies providing expertise.
- HZEV volumes will increase and improve the utilisation of charging infrastructure, derisking investment in a new infrastructure asset class.

In 2025, ARENA has engaged with several investors (financial, strategic or corporate). We have heard from many of these financiers there is enthusiasm for the "thematic" of transport electrification. In addition, many groups have access to dedicated funding pools and consider fleet decarbonisation to be one of the earlier tasks in any climate transition action plan.

We have also heard that uncertainty around base case project returns is driven by:

- the early stage of HZEV uptake in Australia compared to other markets.
- operators needing to "learn-by-doing" through smaller scale trials to understand the operational impacts of converting their fleets and the complexity of integrating into existing operations.
- complexity and availability of charging infrastructure.
- the fragmented state of the Australian trucking market.

Over the year, we have encountered many stakeholders that are set in upholding existing business practices, are constrained by restrictive investment practices or who otherwise have not matched initial rhetoric with decisive action.

ARENA is working with several companies (announced and under assessment) that are looking to solve for these barriers and provide additional data to support the uptake of HZEVs in Australia. We have worked with several investors this year that display significant understanding of the risks and opportunity, coupled with the conviction to act. We look forward to working with additional innovative companies and courageous investors in 2026.

The Clean Energy Finance Corporation has recently provided financing to both vehicle OEMs[6] and charging hub operators[7] as a further proof point that these initiatives are moving along the commercialisation pathway. Along with initiatives from state and territory governments[8], there is plenty of existing momentum in supporting the move to decarbonised transport.

Recognising these initiatives is important, as getting this market started as soon as possible is critical. Given the size of this opportunity and the potential value creation for Australian businesses, we consider that additional efforts across the board are required to accelerate Australia's uptake of HZEVs and meet our national emissions reduction targets.

**Recommendation**:

1. Mechanisms and innovative models that remove barriers to HZEV uptake should be accelerated.
2. Charging infrastructure should be delivered in a phased approach, with capital-city freight precincts developed first near port logistics areas, followed by priority national highway corridors to support interstate operations.[9]

[6] https://www.cefc.com.au/case-studies/volvo-backs-switch-to-battery-electric-trucks/
[7] Cleaner, quieter grocery deliveries with Zenobē, Woolworths - Clean Energy Finance Corporation
[8] EV Fleets Incentive Kick-start funding FY26 | NSW Government
[9] Electrifying Road Freight Report, *AECOM* (2025).

## Key Message 2: Weight limits and licencing requirements should be reconsidered to unlock the potential of HZEVs

We raise two issues (weight limits and driver licencing) for HZEVs that arise because heavy vehicle regulation under the Heavy Vehicle National Law (HVNL) was designed around internal combustion engines.

### A. High Mass Limits should be reviewed to accommodate HZEVs

The prescriptive limits on axle mass and vehicle dimensions inadvertently constrain the deployment of certain HZEVs, which have higher tare weights due to their battery systems.[10] We recognise that some vehicle OEMs have produced or are developing products that may align with existing limits. However, without reform fleet operators face reduced payload capacity and diminished commercial viability, delaying the transition to zero-emission freight.

Conventional steer axle High Mass Limits (HML) of 7 tonnes do not account for the heavier battery packs in many electric trucks, making compliance difficult for operators to consider their operations on par with ICE fleet and discouraging the import and purchase of electric variants.[11] As a result, companies like Toll have had to comply with internal combustion engine (ICE) weight thresholds and reduce payloads for HZEVs, directly impacting operational efficiency and increasing freight costs.[12]

As HZEV design evolves, battery packs may increase to accommodate higher range and utilisation. Increasing allowable steer axle mass and associated measurement tools, such as weigh station upgrades, is therefore essential for maximising payload and utilisation for HZEVs.

Associated changes in industry practice may be needed to complement an increase in HML. For instance, weighbridge hardware and recalibration of software to handle higher axle weights and new compliance thresholds may be required. This problem has been demonstrated in WA, where a NHVR weighbridge recorded a HZEV with axle weight over 7 tonne as being non-compliant, even though it had a HML exemption permit.

**Recommendation**:

1. Consider reviewing Heavy Vehicle National Law and Australian Design Rules to accommodate heavier axle limits without increasing safety and stability risks.
2. Consider Performance Based Standards (PBS) assessments for HZEVs seeking higher axle limits, rather than relying on overly simple administrative thresholds.
3. Consider making associated changes to weighbridge hardware, compliance thresholds and software to support the management of higher axle weights.

### B. Licencing requirements favour ICE drivers

As licensing requirements are based on Gross Vehicle Mass (GVM), the typically higher GVM of HZEVs require equivalent drivers to secure more advanced licences than ICE drivers for equivalent vehicles. Progression to higher license classes typically requires holding a lower-class license for 1–2 years and completing additional training and assessments depending on the jurisdiction.[13] This can discourage operators from adopting HZEVs.

**Recommendation**: Consider reviewing licencing requirements to reduce restrictions to the uptake of HZEVs.

[10] Change Management Report, TGE (2024).
[11] Change Management Report, *TGE* (2025), p. 15.
[12] Ibid.
[13] 'Electrifying Road Freight Report', *AECOM* (2025), p 12.

## Key Message 3: Local road access and permit requirements should be reviewed to reduce complexity for OEM's and fleet operators

Fragmented state and local regulations result in operational and financial barriers to HZEVs, particularly where required routes cross state boundaries and operate in and out of the National Heavy Vehicle Regulator (NHVR) network.

For example, Queensland requires fleet operators to apply to the *Department of Transport and Main Roads* for HML vehicle approvals, a process that takes longer than local council approvals under the Heavy Vehicle National Law (HVNL). In contrast, operators in New South Wales and Victoria can run HZEV fleets with HML on the NHVR network without needing additional state permits. Western Australia and other states interpret requirements independently, resulting in unclear compliance and permit pathways for fleet operators.

These inconsistencies add complexity in planning for interstate freight corridors, at times adding to the financial and operational burden of seeking to electrify commercial fleets.

Even when the NHVR grants exemptions for heavier axle weights on approved networks in NSW and QLD, local council permits are frequently rejected for individual routes outside the NHVR network due to poorly maintained roads or unsuitable pavement structures within their region. For example, one council rejected 8t steer axles entirely, stopping the adoption of HZEVs in the whole region.[14]

This creates significant barriers for last-mile delivery feasibility for HZEV fleet operators. The lack of consistent permitting processes across jurisdictions forces operators to navigate complex and often duplicative applications, leading to increased costs, reduced payloads, and operational delays.

**Recommendation**:

1. Consider standardising road access and permit requirements nationally to reduce complications with interstate freight.
2. Consider expanding the NHVR approved network nationally and mandating that local governments pass on NHVR approvals.

## Key Message 4: Curfew restrictions should be eased to unlock potential of HZEVs

HZEVs are quieter and yet ICE truck curfews apply equally.[15] Amending this restriction where appropriate provides a wider operating window for drivers as a non-monetary pathway to improving operational efficiency.

Curfews were initially introduced to limit the operational hours of truck fleets due to the noise they create in residential areas. Reduced noise from electric trucks means they could extend their hours of operation without materially impacting residents. This could deliver significant financial and efficiency benefits by reducing loads on peak traffic periods, minimising congestion and improving community amenity.[16]

**Recommendation**: Consider curfew easing for HZEVs in to extend delivery hours and improve service efficiency.

[14] Lessons Learnt Report: Milestone 2, *TGE* (2025), p. 8.
[15] 'Electrifying Road Freight Report', *AECOM* (2025), p 11.
[16] 'Electric Trucks: Keeping shelves stocked in a net zero world', *EVC* (2022), p. 5.

## Key Message 5: Australian Design Rules (as applied to HZEVs) should be refreshed

The Australian Design Rule (ADR) framework does not allow HZEVs to transport most classes of dangerous goods, limiting the use cases and associated uptake of HZEVs.

Dangerous Goods transportation beyond *Class 2- packaged dangerous goods* inhibits use cases for HZEVs.[17] Broader classes such as flammable liquids, corrosives and explosives are not approved for electric trucks under the Australian Dangerous Goods (ADG) Code due to safety concerns around high-voltage systems and battery fire risks when combined with hazardous cargo. For the transport of flammable gases by tank vehicle, the code does not mandate that an electric drive train cannot be used. However, it requires that the vehicle complies with AS 2809 4.4.2.3.2 (isolation of shielding of battery packs from DG zones, fail-safe disconnect systems). A HZEV would therefore be out of scope and would not conform with the requirements to be “intrinsically safe” or comply with explosion-protection electrical standards.

ARENA’s portfolio of freight operators has experience in handling dangerous goods. These companies have tried in recent months to gain approval to carry Dangerous Goods (DG) with HZEVs, to no avail.

**Recommendations**:

1. Harmonise best practice International Standards such as UNECE ADR 2025 technical requirements for HZEVs and mandatory compliance with regulations such as R105 for vehicle construction and electrical safety.
2. Establish a dedicated technical standard for HZEVs in DG transport and expand permitted DG classes beyond Class 2.
3. Streamline the approval process for fleet operators who meet enhanced safety and compliance standards to enable further specialised HZEV applications.

[17] Lessons Learnt Report: Milestone 2, *TGE* (2025), p. 10.

# Appendix

| Information Request | ARENA Response |
|---|---|
| *Information Request 1: views, data and evidence necessary to analyse / model regulatory forms, including:* | |
| appropriate reforms to assess under this proposal, e.g. increases in general mass limits under the HVNL | See Key Insights 1-5 |
| additional cost of road wear and infrastructure maintenance | N/A |
| intersection with other infrastructure barriers necessary to take up reformed regulation | See Key Insight 2 |
| implementation issues, including how governments should apportion any increased road infrastructure costs between levels of government | N/A |
| how imported vehicles can comply with both international and domestic standards to allow vehicles (including heavy zero emission vehicles) to be imported without being repurposed | N/A |
| availability of data on road use, the structure of the road network, and different heavy vehicle users (and user industries). | N/A |
| *Information Request 2: views, data and evidence in relation to this proposal, including:* | |
| future coordination and alignment between the states and territories | See Key Insight 3 |
| how best to determine which roads might be eligible for automatic access, initially and on an ongoing basis | N/A |
| the technical and administrative practicalities of scaling up Tasmania's model to the whole of Australia | N/A |
| the costs and benefits of the current access permit system borne by heavy vehicle operators | See Key Insights 2-3 |
| availability of data on road use, the structure of the road network, and different heavy vehicle users (and user industries). | N/A |
| *Information Request 3: views, data and evidence in relation to this proposal, including:* | |
| what are the largest hurdles for timely or accelerated implementation of these reforms | N/A |

| | |
|---|---|
| what federal, state & territory or private bodies are expected to handle the various stages and aspects of implementation | N/A |
| what timeframes are sensible for accelerated implementation of the reforms | N/A |
| data relevant to quantitative estimates of productivity impacts of the reforms | N/A |
| how best to quantify the impact of the reforms | N/A |
| *Information Request 4: views data and evidence in relation to this proposal, including:* | |
| regulatory barriers to the roll out of charging infrastructure for battery heavy powered EV trucks | See Key Insight 1 |
| other practical barriers that may be limiting installation and operation of charging infrastructure | See Key Insight 1 |
| policy issues affecting the long-term implementation of an effective network of publicly accessible EV truck charging infrastructure | See Key Insight 1 |
| *Information Request 5: views, data and evidence in relation to this proposal, including:* | |
| comparative noise levels of electric heavy vehicles and internal combustion engine heavy vehicles | See Key Insight 4 |
| how significantly any noise reduction ameliorates the negative impacts of night-time travel | See Key Insight 4 |
| implementation considerations, given different levels of government have responsibility for the implementation of curfews, particularly local governments in residential areas | N/A |
| how the effects of any reform could be quantified, including any data and modelling requirements. | N/A |

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