

# Transport and Infrastructure Net Zero Consultation Roadmap

## Take the survey

Department of Climate Change, Energy, Environment and Water

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2 Please indicate how and if you want your submission published.

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Transport Strategy Global

4 Confirm that you have read and understand this declaration.

Yes

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9 Who are you answering on behalf of?

Organisation

10 Organisation name

Transport Strategy Global

11 What best describes you or your organisation?

Industry

12 What sector do you represent?

All transport

13 What state or territory do you live in?

New South Wales

14 Postcode

2075

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.

These high level principles, taken as a whole, can provide a matrix evaluation tool to determine the most useful pathways to lowering emissions.

While it may be implicit in the principles, it may be worth calling out three more for completeness:

1) Minimise Sovereign Risk - by rapidly reducing reliance on imported liquid fuels. This is

raised because it gives impetus to a transition that may otherwise be forced upon Australia without sufficient adjustment time.

2) Maximise Transition Integration - with Australian energy markets at all three levels and the resources sectors to both stimulate uptake and align investment priorities for domestic transport energy production. While implicit in Maximise Economic Opportunity, the alignment of market incentives, research and development, infrastructure and distribution investment and pricing for transport all require significant detailed focus to enable transport energy transition. The current policy approach is segmentation but integration is required very early.

3) Lead Research and Development. Perhaps implicit in Evidence-based, but we suggest that some evidence needs creation, and that can be through practical delivery trials to accelerate knowledge, stimulate investment and respond (outside of cities) to some nationally unique operating conditions.

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

Yes

**19** 2.1 Please add details to your response.

There are constraints to the reality of this approach which are undermined by significant investments, embedded systems and lack of governance control from a Federal Government perspective.

Every State has had a similar policy guideline for decarbonisation for more than a decade, has invested billions of dollars over the past decade, but has yet to succeed.

And every State has invested in more road capacity for urban transport than public transport and thus stimulated demand.

These facts point to a governance and economic analysis bias that are actively working against Australia reducing emissions on a significant scale. But they may also point to a political reality which means the overwhelming effort will necessarily be on "improve".

The weighting in a national action plan needs to rightly call this out, because if we plan in hope that Australian urban areas will somehow become Copenhagen or Amsterdam we will fail. We do not have the density and also our smallest mainland cities are much bigger physically and have greater populations. We are much more American in our planning

typology and public attitudes and this should be factored in.

Some additional points to consider include:

a) Covid provided the greatest avoid stimulus for urban areas in history. It has significantly abated demand on networks with a real and sustained reprofiling of demand for work based trips. However, this has had a significant impact on city economics and there continues to be major lobbying for a return to offices.

As the economy cools down this effect may abate, though it is unlikely that we will see the 5 day twin peaks model at full strength again.

However, given it took a global pandemic to create that change it is worth considering how ineffective many global efforts at "avoid" have been for decades.

Thus, relying on avoid beyond what has happened should be avoided. Trying to achieve it is laudable, but modelling investment or change on achieving even 2 per cent avoidance of trips would be risky.

b) "Shift" requires significant investment and applies only to urban communities in any volume.

City and urban employment/study cores are most suitable and there are many examples of success in achieving mode shift. However, that mode shift is mostly to public transport. Walking and cycling remain limited and even a 100 per cent lift in either will have very moderate system wide effects. Sydney CBD is unique in Australia in having internationally leading public transport share, which has been maintained as the population has surged. This is a great combination of local government policies supporting massive State public transport investments. But with nearly \$100bn of investment in public transport, the effects are still quite limited more than 5km from the CBD.

Thus it must be acknowledged that outside of cores public transport is considered highly successful if it can carry 25 per cent of movement, at a cost of billions per annum. No State in Australia is in a financial position to significantly challenge this. A good target is to avoid growth in vehicle kilometres travelled (VKT). However, even this is fraught with complexity due to the land development patterns of Australian urban areas. They are not suited to high frequency public transport with easy access. The cost to provide competitive travel times is exceptionally prohibitive, even with technology improvements.

Despite record investment in transport infrastructure and services on the East Coast, every State has increased VKT over the past decade, even accounting for the substantial drop during Covid. There has also been significant investment in motorways (because of the flawed economic analysis approach in Australia) which has induced demand for trips and provided for substantial growth in traffic for another decade.

Record employment has resulted in record travel as is predictable. The forecast economic softening for the next 3 years may stabilise growth in travel demand but it is unlikely to reverse it more than it will re-establish as the economy recovers.

Again, mode-shift work should not be stopped. However, relying on mode-shift to reduce emissions will simply lower the growth rate of emissions, not reverse them.

c) "Improve", after a very slow start, has the highest probability of success in a complex, market-based and free society such as Australia.

However, it will require significant coordination to catch-up with Europe or California. In NSW 0.1 per cent of the light vehicle fleet is electric. Outside of buses, heavy vehicle electrification is so small it does not register.

The new regulation around fleet fuel efficiency and the government interest and investment in this area has significant potential to have substantial impact.

Most importantly, though, "improve" is often read in this context as complete fleet switch-over. And that is a 30 year project at best. "Improve" should be taken at face value. A great deal of improvement is possible without replacement, particularly for heavy fleets and for regional fleets. And this path to improvement also provides real stimulus for economic performance and reducing sovereign risk while using existing skilled workforces (with some training).

**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.

This is a qualified response.

While an active and public transport framework will support emissions reduction in the

long term, subject to a national agreement and multi-lateral funding arrangements, it is very unlikely to have a meaningful effect in reducing emissions within 15 years.

Mass public transport is extremely efficient in creating mode shift between specific origin and destination pairs where there is a high volume of movement. However, it takes a significant amount of time to deliver meaningful upgrades and costs many billions of dollars.

And with the weak demand curve for employment related transport of knowledge workers, the backbone of public transport demand, it is unlikely any major city in Australia requires significant capital investment beyond what is already being committed.

Major states and major cities already have significant investments, new infrastructure, improved services, fleet decarbonisation plans and active transport implementation underway.

## 22 4. What should be included in a national policy framework for active and public transport and how should it be developed?

So the more pertinent question is: what value does a national framework overlay bring that materially improves systems performance such that emissions reduction is enhanced?

There are some easy wins. Regional school bus fleets are relatively easy technically to electrify as they are vehicles with very predictable usage patterns. But the cost of charging infrastructure is beyond most providers (mostly small businesses contracted by government). The cost of converting diesel to hydrogen is relatively moderate, except there is no fuel supply. And there are no suitably ruggedised models yet on the market. Federally, then, we need a standard to create a market for regional school buses in the mini, midi and city classes that can cope with the dust, vibration, heat, ground clearance for dish gutters and other environmental factors.

Such a fleet could be produced locally, but an allocation of bus-type to State manufacturing with a Federal control is necessary to get the sort of scale required.

We could take the opportunity to modernise bus standards so that costs could be reduced by accepting international standards for bus width, meaning the best technical solutions would be cheaper. And also mandating modern safety features including 360

degree cameras, automatic braking at low speeds, bicycle and pedestrian detection. So that attracting drivers is easier.

Bus stops that do are not passed frequently do not attract advertisers, and thus they do not get shelters funded by advertising. This means a great proportion of our national urban area has terrible bus stop infrastructure. It is nearly invisible, it repels anyone thinking of using public transport because standing in the rain or the sun is not fun, and could create much needed regional employment in the construction of a standardised shelter specification with some funding support to local government.

A national speed standard for urban areas of 30km/h and a Federal input contribution to street treatments to make it work. That is far cheaper than providing bike paths as at 30km/h the road can be shared safely.

Overall Australia has some very large cities on a global scale but a tiny total population. Rigorously reviewing standards and eliminating boondoggles of the past and focussing on efficiency and cost reduction by adopting international standards wherever possible (and that means regional Asian standards, not just US or European), would be a very useful national action. This applies to infrastructure elements, fleet, information standards and systems integration.

## 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?

A significant governance step would be to review and agree, probably via Infrastructure Australia, on a new assessment mechanism for the economic value of such infrastructure and services. Current State transport models penalise walking and on-road cycling as an impediment to traffic, loss of parking as a cost but do not trade-off benefits to businesses of walkers and cyclists (the evidence shows they stop more often and spend more per journey), do not account for the time benefits in the movement of people across intersections connecting to things like public transport and other wrinkles most planners and modellers know well. Yet still they persist to align with transport model and economic model standards. Also there is highly variable approaches to the value ascribed to removing emissions from the transport system. Therefore, it would be beneficial to create a national modelling and economic assessment framework of values for active and PT interventions in networks. These would have to have city, urban, peri-urban, regional and rural sub-values to ensure that the real cost of change and the real benefit of change was captured.

In reality active and public transport are related, but they are not the same thing. People walk to their car and from the carpark, but we do not relate active to driving. The complexity of public transport systems and services and integrations deserves its own distinct national framework. And so does active transport.

A decision needs to be made where electrically powered cycling and personal mobility devices (scooters, skatedboards, bikes) etc fit in the national model. They have emerged rapidly, but nowhere has really accounted clearly for how they fit in safe systems, cycling or walking infrastructures or traffic systems or rules. A national framework would be beneficial to ensure the full benefits are possible to capture, as these devices can remove the desire or requirement for a second car for many households far more effectively than traditional cycling or walking measures. But avoiding the ideological cant around them being vehicles and thus detrimental must be avoided. Anything that decreases car dependence is good, even if it does replace a proportion of cycling or walking. While health is critical to national well-being, the attempt to mode shift from car should be front and centre. Similarly the concern that riders will come from public transport is actually good, because they typically come from over-crowded inner urban areas, or very poorly designed circulatory public transport that does not attract people. Agreeing on a value typology would be beneficial.

All national frameworks, even the "standardised" Australian Road Rules, typically fail to be fully implemented due to State differences. Therefore, identifying with the State stakeholders the things that are beneficial to them, but leaving wriggle room in the framework to implement to local conditions and standards will be necessary. In this way the majority of the work in developing a standard framework will have benefit. The old standard of not letting perfection be the enemy of good is critical in this arena.

An agreed guideline on the balance between accessibility and attractiveness of public transport is required. For example, in the ACT, WA and NSW there are coverage requirements that equate to getting within 400m of every dwelling in the metro. But, that means there are bus routes that go everywhere, but take a very long time to the attractor (like a centre, a train station, the shopping strip). Thus they meet coverage, but have extremely low patronage. They waste public money, fail to provide a reasonable and attractive service and increase motor vehicle use as a result. Direct services that provide good connectivity show much stronger patronage. There is also a problem with hours of service, particularly where trunk services are provided by rail for 18 hours a day, but the buses run 12 to 14 hours a day. Thus people must drive to rail, and therefore once in the car are inclined to just drive. Finally, the excessive cost of the overlap between school peaks and commuter peaks needs to be decoupled to maximise the value of investment in

public services. Extended school hours in some jurisdictions are increasing this tension. States are often weak on change without a lever to justify it, such as a new national standard.

## 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?

It is great to see the recognition that the sector operates on thin margins and it is not able to easily recapitalise around decarbonisation.

This creates a situation where the good vs the perfect must be considered to accelerate transition, and where the right incentives must exist to create change.

The automotive manufacturing industry cannot respond by bringing more vehicle product to market without confidence that the demand for product will exist within the capacity of the industry to procure.

The energy and resources industry cannot invest in the energy and fuel production and distribution without clarity to forecast demand.

The manufacturing and services industry no longer warehouse materials but rely on just-in-time delivery as a standard operating procedure, shifting the cost to the logistics sector and creating a supply chain risk that can significantly reduce productivity - the opposite of the intention.

The sector in general cannot raise prices easily to cover increased costs because there is no compensating mechanism to prevent people with very degraded and polluting vehicles, which have been written down for capital, competing by cutting price and taking share.

The public has become conditioned to experience rapid delivery windows with no cost penalty due to fierce competition, which has significantly degraded load consolidation and created more emissions needlessly.

This is a combined set of market failures that mitigate against action to reduce emissions, and which in fact have created increased emissions year on year from the freight sector.

Therefore, additional issues to consider include:

- 1) support for the logistics sector to navigate with the energy sector to ensure that as first movers they do not wear the cost of network upgrades to align with government policy
- 2) access to reasonably priced independent advice on hardware (for charging), energy supply and fleet
- 3) favourable accelerated depreciation for decarbonisation assets for the first 10 years or until the market is sufficiently mature that there is real price parity - total cost of ownership is irrelevant to small operators to who initial capital costs are critical
- 4) using the US Department of Energy guidance on rapid decarbonisation, examine creating a liquid hydrogen conversion sector and fuel supply
- 5) regulation of the supply of sufficient charging infrastructure to ensure service continuity at scale (noting that sharing charging infra with light vehicles is in appropriate)
- 6) much faster creation of a skilled maintenance workforce for charging and vehicles using new energy
- 7) push success stories from the region
- 8) create a technology menu

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

- 1) Navigating the Australian energy market, the distributors and retailers is not an industry skillset and is a significant barrier to change. The concept that a fleet operator with 1-20 trucks needs to procure a substation and connection at their own price to "fuel" a fleet needs to be seen as inappropriate. Creating a regulatory requirement on the wholesalers and retailers to distribute the energy required, within an agreed minimum timeframe (and planning controls), preventing the capital cost being required to be paid upfront (instead amortised in the unit price per kw), and allowing automatic onsale of energy from a fleet charger to any other vehicle operator all needs to be considered. With a million HGVs in the country, and the vast majority in the metro, Australia is ideally suited for electrification, but without supply to energy without hassle there is no hope to grow the market.
- 2) Particularly in the early years of transition, funding industry bodies representing the different operator types so that trucking operators are not at the mercy of an emerging sector desperate to recover venture capital loans, will create more trust and confidence in a change to electric trucking.
- 3) Incentivising the industry to change to E power will be necessary until the early majority is reached, similar to the stimulation to the private car market. Trucking is about 8 years behind electric cars in tech maturity, and the supply chain is still very thin.

Providing accelerated depreciation is a great signal to the supply chain to bring more options into the small Australian market because it is a familiar way of operators overcoming the cost of expensive plant. If the incentive is set up correctly the higher upfront cost should be off-set such that the lower total cost of ownership has relevance for those who keep vehicles for 5-8 years (the majority of the 4.5-14t market). This could be extended in future years for buying second hand e trucks to create a strong used market and quicker total fleet uptake.

4) The outcome sought is lower emissions towards zero emissions. The US DoE estimates that liquid hydrogen (for example as used by JCB) in converted diesel engines could result in a 95 per cent decrease in emissions at less than 10 per cent of the cost of hydrogen fuel cell fleets. This also reduces the loss of embedded emissions in existing fleet power plants. However, this is contingent on harnessing the current enthusiasm of the resources sector to create a green hydrogen sector. And that requires fuel creation and distribution. Any study should focus on how to solve the regional long distance, high weight, sector that electricity can't yet support without creating major inefficiency in the supply chain. That would allow rapid decarbonisation of urban freight fleets while the regional fleet solution matures.

5) While charging solutions provider will put chargers where they can most easily profit, putting them in place in less commercially viable centres will be ignored. Working out a regulatory minimum coverage and appropriate industry supports to ensure a supply of 350kw chargers in metro areas, and megawatt chargers on national connectors will be required. The psychological benefit of visible access to chargers every 100km should not be underestimated to a logistics operation that is highly skeptical of electrification.

6) While there is a shortage of diesel mechanics and an ageing workforce, there is no available workforce of electrical engineering mechanics who can work on fleets at scale. While there is talk of growing this workforce, full scholarships in electrical automotive engineering specialising in EVs (light and heavy), charger network maintenance, depot electrification and mobile support is critical to overcoming the risk operators see in making a change.

7) Australian Post and its push into electrification, Fonterra in NZ with the roll out of electrification of its milk tankers, the numerous massive electric fleets in the region all need calling out and marketing in a national campaign to make it clear not only does the fleet solution exist, but companies have already taken the commercial risk to shift. At the moment the national mood is quite cynical and there is sufficient evidence to make it confident

8) Just understanding the various options requires significant investment. From mild hybrids to fuel cell, from bio-fuel to electric trailers, there are so many options that need to be matched to the highly variable operational scenarios that operators engage with. Creating a simple, visual and interactive tool that can be accessed via phone, with links to support and advice, would help stoke curiosity and also create more good news stories

that build that confident sector we need.

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

Yes

27 7.1 Please add details to your response.

Other than the focus on hydrogen for light vehicles which is unsupported by the vast majority of industry, any fuel supply, evidence base or experience the pathway is largely good. In the choice of where to focus energy and money in the next decade it is incontrovertible that the greatest return on investment will be from supporting electric vehicles. Price parity for EVs is still five to seven years away (that is feature for feature and performance equality). For hydrogen it is at least 20 years away.

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?

The globally accepted metric for electrification to accelerate from early adoption to early majority is 5 per cent fleet penetration. Australia is at 0.1 per cent.

Additional actions that would help us move through the current uncertainty, which is really about affordability and lack of fleet options for some uses, include:

- 1) Reintroduce incentivisation for new and used EVs
- 2) Regulate the service station sector to include more charging points, including availability requirements
- 3) Regulate the property sector to require safe home charging in unit developments (both home and light industrial)
- 4) Create uniform national regulations for on-street charging minimum provision for adoption by States
- 5) Create uniform national fire regulations for EVs and charging infrastructure for adoption by States
- 6) Stimulate demand by requiring every government vehicle to be electric and to be traded after 2 years

- 7) Investigate the vehicle standards for 2030 and determine if battery swapping is viable (to ensure signalling to the automotive sector to adapt)
- 8) Investigate the value of conducting inductive charging trials for passenger fleets such as taxis and share vehicles at places like ranks

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

### 1) Reintroduce incentivisation for new and used EVs

Those markets with the greatest EV penetration have the greatest user incentives. EVs in Australia are heavily skewed to top tier tax payers living in inner cities and urban areas of concentrated wealth. This points to a failure to create incentives that enable people with lesser means to become part of the change. Creating a range of targeted incentives would increase uptake of more modern, fuel efficient vehicles.

Building on the tax breaks for key workers like nurses, teachers and uniformed services, enable FBT exemption and salary sacrifice for new and used EVs (up to 3 years old) to accelerate uptake by those who typically work shifts and cannot rely on peak public transport networks.

Provide a purchase grant to people who earn 120k or less for a new or used EV, taken off the purchase price (to enable cheaper financing).

For people living more than 150km from a centre with a population of more than 10 000 provide an additional grant for the long-range battery option (excluding LCT vehicles).

Provide a trade a banger incentive for people who have a pre-2010 vehicle and have owned it for two or more years into a 2020 or later petrol or EV (with the trade having to be recycled).

We take for granted that there is a service station within refill range wherever we are in most of Australia. Many people in urban Australia will not have seen an electric vehicle charging in their suburb. Visibility creates confidence and overcomes bad media.

### 2) Regulate the service station sector to include more charging points, including availability requirements

Require all existing service stations to have a minimum of two 350kw fast chargers,

unless there is a public fast charger within 300m, in which case a minimum of one must be provided. And penalties applicable if the chargers are not in service 98.5 per cent of the time.

3) Regulate the property sector to require safe home charging in unit developments (both home and light industrial)

Globally nearly 85 per cent of charging occurs at home on a trickle charge overnight using off-peak power. But the body corporates of Australia are risk averse and resisting providing recharge points in units. There are many smart technologies that can ensure that the user is charged, not the body corporate; that multiple vehicles can charge on the same circuit at off-peak rates; that cut off if there is any over-heating or fire risk. This needs both education and regulation so that body corporates must comply, just as they do with fire risks.

4) Create uniform national regulations for on-street charging minimum provision for adoption by States

On-street charging for the many Australians who do not have off-street parking is critical for uptake. The primary issues are supply, access, safety and price. The majority of such provision falls to under-resourced local governments. Creating a national standard that they can reference for procurement, including a regulatory safety requirement, would increase uptake and make it easier for the charging industry to focus effort. Such a standard should include parking signage and control standards so that EV spots do not become de facto free all day parking.

5) Create uniform national fire regulations for EVs and charging infrastructure for adoption by States

The fear of litigation appears to be creating avoidance behaviour in local governments and in body corporates. Creating a uniform set of requirements vastly reduces risk and makes procurement much easier.

6) Stimulate demand by requiring every government vehicle to be electric and to be traded after 2 years

Government's have immense effects on fleet imports due to the size of the market. By requiring every government vehicle that can be to be electric, across all levels of government, and requiring a maximum 2 year term before trade, the Government could stimulate a range of markets. Creating a strong used EV market enables far more people

to buy-in at a reasonable price, and ex Government vehicles are trusted as they are typically well serviced. In terms of exemptions, our experience is that a high deterrent is required to avoid fleet managers holding onto their favoured petrol fleets. For example, a full business case that must be submitted to a minister for exemption might improve compliance.

7) Investigate the vehicle standards for 2030 and determine if battery swapping is viable (to ensure signalling to the automotive sector to adapt)

While generation 2 battery swapping is gaining high traction in motorcycles across Asia, India and SE Asia are increasingly looking to battery swapping to lessen the cost of charging infrastructure distribution. However, to be widely adopted this requires a national standard. Starting to understand this now and working with the sector to work towards a change could have significant benefits in the next decade.

8) Investigate the value of conducting inductive charging trials for passenger fleets such as taxis and share vehicles at places like ranks

There has been a rise in interest in embedded charging infrastructure to influence heavy use fleets like taxi operators. In many other countries taxis have become effective demonstration fleets for EVs and some cities have 100 per cent electric taxis. Both providing procurement incentives, but also ensuring that spot charging to enable 24 hour operation, is necessary in the Australian context. Rank charging is technically mature, but it does require specific vehicle upgrades. An investigation with the industry should be undertaken to see if this, or other, incentives would increase electric vehicle uptake.

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

Yes

**31** 9.1 Please add details to your response

As per earlier responses, working closely with industry to explicate the wide variety of use cases and match a technology menu to them, to help the industry understand options and costs, would be very useful.

**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: Battery electric

2: Low carbon liquid fuels

3: Hydrogen fuel cell

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

Battery Electric is the most advanced technology with the fastest improvement pathway, the greatest number of options already available for purchase (mainly in the 4.5-14 tonne categories), the most affordable and has the only supply chain of energy of the three options that exists at a national scale. BE can effectively support more than 95 per cent of freight fleet needs.

Low carbon liquid fuels are a complex area. But as per previous responses, the US DoE is convinced of the benefits of liquid hydrogen as a transition fuel, but there also needs to be large investment in fuel supply. Bio-fuels are hard to justify given the climate issues we face in Australia that can make crop based solutions highly vulnerable to weather events. Synthetic fuels are unproven, expensive but useful in very limited markets and may not lead to significant reductions as a result.

HFC is proven to be very high cost, has no reliable fuel supply but is useful in a small range of applications where BE may not be capable. However, the reason it is ranked third is because the use case for HFC is typically heavy, long-haul trucking. However, the road conditions in Australia are deplorable outside of the national network and HFC are known to be unreliable where vibration and suspension shock is prevalent, and therefore may be unable to fill that gap.

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

If the US DoE is correct, in Australia as a transition fuel hydrogen conversion of diesel could play a significant role. With nearly a million HGVs and the majority being diesel, and with life spans regularly exceeding 20 years, this is worthy of serious investigation. The demand would be sufficient to justify the supply chain, and the emissions benefits would be close to the total cost of electrification because it would enable existing fleets to be converted rather than replaced. However, this is highly complex and requires a full systems and market investigation to prove up.

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?

There is no single solution that will work for this sector, and particularly for the very heavy goods vehicles (16+ tonnes).

A national investigation and standards should be published for transition that takes into account all of the hybrid options possible. For example, in stop start traffic up to half the emissions of a vehicle occur on take off. A mild hybrid that gets the wheels turning on electric before a diesel could be a significant transition operation.

Electric trailers are entering the market. Like a mild hybrid, the trailer can provide the torque support to move a heavy load and save on diesel emissions. These require no link to the tractor telematics and are thus a relatively simple transition solution, but also a long term solution to extend trucking range.

Trailer design should be investigated federally and findings published. It is well known that curtain sided trailers are highly susceptible to loss of tension and create significant drag, a killer for BE truck range but also increase existing truck emissions.

Essentially, a technology menu for HGVs that move from now to the known future should be created and regularly (every 18 months) updated.

In previous responses there are also actions to be considered around the availability of charging infrastructure and incentives for change.

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

Yes

37 13.1 Please add details to your response.

We do not have rail expertise but understand the low maturity of alternatives to traditional diesel electric locomotives where full electrification cannot be achieved.

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?  
Yes
- 44 17.1 Please add details to your response.  
Other than noting the rapidly increasing use of containerised battery swaps for passenger ferries in northern Europe and a growing reliance on hydrogen gas turbines in megaships we have no additional useful insights to offer.
- 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?  
We have no expertise in aviation.
- 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.  
The pathway is surprisingly narrow and insufficient to create meaningful change.
- 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?  
Design changes are critical to reducing emissions in infrastructure. Lowering the

emissions in steel and concrete is the lowest possible response.

A national review of:

All transport infrastructure standards with a lens on reducing infrastructure size to only that necessary is required. Standards have become bloated and this has already triggered significant cost increases. The carbon intensity has risen with this lazy design approach.

All systems for approving and challenging infrastructure necessity should be investigated (as discussed earlier). There are inbuilt systemic governance biases that result in more roads investment and less public and active infrastructure than required.

Circular and nature-based infrastructure fitness for purpose needs review and standards agreed to accelerate low carbon design options. The ease and speed of, for example, flowcrete over nature for slope management, rather than planting and gabion boxes is typical of how bad practice has become standard.

How to value carbon savings in embedded materials, but also in the induction of demand, is required to evaluate the best option.

Options analysis, which has now fundamentally failed in Australia, where options now are, for example, low, medium and high scales of infrastructure, rather than what mix of services/pricing/infrastructure might avoid or defer new infrastructure.

How to avoid competing infrastructure investment. In NSW in the past decade significant motorway supply has occurred at the same time as investment in Metro rail on the same links. This used public monies to compete for the same demand in some instances which is bad for carbon and bad for value for money.

What is the pathway to greater automation of HGV fleets to enable smoother operation (including prime operating hours and appropriate road pricing to stop HGVs operating in peak traffic flows).

## 54 22.1 How would these actions address the identified challenges and opportunities to reduce transport infrastructure emissions?

They would give government more options less reliant on a very small choice, potentially defer unnecessary infrastructure investments and generate more cogent and informed

decisions. National reviews are important to avoid the State-based prejudice that supports local interests over national benefits.

- 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?

See the previous sections related to light and heavy vehicles.

- 56 24. How should the use of low carbon liquid fuels (LCLFs) be prioritised across different transport modes over time to achieve maximum abatement?

LCLFs should first be proved for abatement value, cost, effectiveness, engine lifespan/corrosion/maintenance costs and creation of flow on effects before decisions on investment or targets are set.

- 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?

The US and Europe in particular have already undertaken significant trials and testing of technologies and systems. These learnings should be reviewed and assessed against local conditions. For example, urban solutions are largely transportable. But only parts of the US and Canada have similar operating conditions to our regional situation.

Working with business and industry should focus on really understanding the operating scenarios and getting the base comparative scenarios against which to test any proposed actions. No approach should reduce the operational efficiency or economic security of Australia.

Communities are skeptical of these changes and there are many voices undermining confidence. Yet when we look at what industry players are doing and see very large investments, confident that new low carb technology is fit for purpose. Having industry talk about their confidence, rather than lecturing the community via government, would have greater positive effect.

- 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?

DG Move in the European Union has undertaken multi-lateral negotiations and discussions for a decade, with industry showcases, subsidies to test technologies and open publication of successes and failures.

Industrial giants like Pepsico, Walmart, Amazon, DHL and others have moved quickly into low energy vehicles with success, but also clarity on the challenges.

59 25.2 What opportunities can Government leverage to show leadership in Australia and internationally?

Support industry bodies in bringing industry leaders from around the globe to talk in industry language to the industry for HGVs. Sponsor professionals from European and US governments that have had success with light vehicle transitions (and failures) to engage with the sector here (Ireland, Finland, Norway, California have very different but useful perspectives). Even NZ is ahead of Australia! And create a close dialogue between the vehicle import industry and the Australian Govt to ensure that very clear guidelines and expectations are in place. On infrastructure, annually bring the project leaders of the top five low carbon structures globally to Australia for education seminars with the design sector.

60 26. What measures and metrics should be used to evaluate the final Transport and Infrastructure Net Zero Roadmap and Action Plan?

Reduction in carbon intensity per km of people travel and tonne of freight.

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?

Public confidence.

62 27. Do you have any feedback on the proposed review process?

This webform and the lack of formatting ability is painful.

63 28. Do you have any further feedback on the Consultation Roadmap and proposed pathways?

Not answered

- 64 28.1 Is there anything missing? Are the sections appropriately integrated? Is the Roadmap appropriately ambitious?  
The ambition in infrastructure is severely limited. The lack of transition pathway focus is disappointing. The lack of consideration of pricing as a tool and lack of recognition of economic evaluation tool effects are gaps. The sections are overlapping and the latter sections in many respects repeat earlier sections.
- 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?  
No
- 67 Have you removed any identifying information from your submission?  
Not answered
- 68 Upload a submission  
Not answered
- 69 Upload a submission  
Not answered
- 70 Upload supporting file  
Not answered
- 71 Upload supporting file  
Not answered