Transport and Infrastructure Net Zero Consultation Roadmap

Take the survey

Department of Climate Change, Energy, Environment and Water

Response received at:
July 26, 2024 at 12:27 PM GMT+10

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sbm2f82b155ea9c8c40a9894

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3 Published name
Climate Change Balmain-Rozelle Inc

4 Confirm that you have read and understand this declaration.
Yes

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Derek

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Bolton

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9 Who are you answering on behalf of?

Organisation

10 Organisation name

Climate Change Balmain-Rozelle

11 What best describes you or your organisation?

Not for profit

12 What sector do you represent?

Climate change/net zero

13 What state or territory do you live in?

New South Wales

14 Postcode

2041

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.

Long term vision:

Ideally, the starting point should be a long term vision for how the sector as a whole will operate, and how it will interoperate with other sectors, particularly electricity.
Next is to lay out a path to that, which will be a trade-off between arriving at it in the least time and effort and, on the other hand, achieving rapid emissions reductions in the near

term.

For example, the division and linkage between rail transport and road transport: Will further road building be a stranded asset? How should the "last mile" be handled?

Carrot versus stick:

It would appear from the roadmap as a whole that there is another, unstated, principle: all carrot and no stick. Rather than penalise production of emissions, taxpayer funded subsidies are proposed for lower emissions options. This violates the stated equitability principle.

It also hamstrings the avoid element of the framework. We appreciate the political difficulty of raising the price of high-emissions activities, but it is not always possible to achieve a desired change by carrots alone. While in principle it might be possible to reward avoided transportation, in the same manner as aspects of the Carbon Farming Initiative reward avoided emissions, it would be even harder to vet than is that scheme.

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.

Despite the intent of a three-pronged avoid-shift-improve framework, the structure of the Consultation Roadmap leads to an emphasis on reducing emissions from each mode independently.

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.

It should not inhibit individual States from going further.

22 4. What should be included in a national policy framework for active

and public transport and how should it be developed?

Public transport:
- Buses
Because of the elevated demand in evening rush hour, there is the opportunity for electric buses that are idle during the day to help soak up surplus PV generation; similarly, surplus wind power during the night.
Some level of coordination may need to be imposed between the statutory energy organisations, the service network providers and the bus companies to maximise the benefits.
Public transport patronage is well below pre-pandemic levels. Measures are needed to restore confidence. At a national policy level that could include hygiene.
- Mixed mode
More attention needs to be paid to integrating transport modes.

Active transport:
- Commuting
Fewer Australians commute by cycling or walking than at any time in the preceding fifty years. A team of researchers at RMIT list excellent suggestions for encouraging cycling: https://theconversation.com/why-do-so-few-people-cycle-for-transport-in -australia-6-ideas-on-how-to-reap-all-the-benefits-of-bikes-229811

The take-up of ebikes has changed the equation for active commuting. Not only has it become practical for many more people, it has significantly increased the feasible distances.

Accordingly, more and longer dedicated cycleways are needed radiating from and between the urban centres, particularly where there is no convenient rail link.

(A possible downside is that inclement weather may create a surge of demand for less exposed options and these might no longer be adequate.)

- Local trips
There are many adjustments to urban design that would encourage less use of cars for shopping and access to local services.
o Pedestrian precincts in commercial areas
o Cycle lanes, including counter-flow
o Pedestrian and cyclist shortcuts through housing developments
o Lower speed limits
o Footpaths not cluttered by signage and cars parked on pavements

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?

- Shift

We note that the sections of the Consultation Roadmap on individual transport modes, 3.1 to 3.5, only discuss emissions reduction per use of that mode. They do not address the "shift" element of the framework. Perhaps that is covered in the National Freight and Supply Chain Strategy.

The full cost of road freight includes the externalities of road damage (which rises as the fourth power of axle load), pollution from ICE vehicles (both GHGs and more direct health harms) and road trauma. If those costs are to be borne partly by the taxpayer then there should be a corresponding subsidy for rail freight.

More generally, a trap to be avoided is putting in place a measure in one mode that discourages a better solution of shifting to or from another mode. Subsidising gas or LCLF for road transport, for example, may deter a shift to rail when, overall, the latter is of greater benefit.

- Avoid

Likewise, the optimum solution in some cases may be to reduce the freight distance by having a more local source. That solution is not discovered by fully subsidising a lower emissions mode of the existing journey.

In short, it is impossible to reach the most cost-effective emissions reduction without allowing existing deliveries to become more expensive for the end customer.

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

By creating a "carbon-level" playing field.

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.

- Hydrogen

We do not recommend the support of hydrogen fuel cells for light vehicles, neither in regards to vehicle purchase nor in regards to infrastructure. While we appreciate the virtue of being technologically neutral, it is likely to result in an unfortunate dilution of resources. The total demand for maintenance engineers and fuelling infrastructure, already constraints on the EV roll-out, would be increased.

Governments are supposed to avoid picking winners, but sometimes it is important to avoid encouraging losers, as with nuclear power.

There is some reason to suspect that hydrogen-fueled transport has been overhyped by unscrupulous entrepreneurs.

https://cleantechnica.com/2024/06/26/another-day-another-hydrogen -transportation-firm-sinks-into-its-inevitable-fate/

- Road user charging

We note the reference to road user charging in "2.1 Movement of people: promoting active and public transport". Since the damage done to a road rises as the sum of the fourth powers of the axle weights, nearly all road maintenance cost comes from use by heavy goods vehicles. If it were purely to pay for road maintenance, the fuel levy for petrol and Diesel light vehicles would only be 10¢ per litre, and EVs are not that much heavier.

The existing fuel levy would be more appropriately considered a health levy based on particulates and noxious gases. Hence a fair scheme would introduce a modest mileage levy for all but retain a fuel levy on hydrocarbons.

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?

1. The existing New Vehicle Efficiency Standard (NVES) is flawed.

1.1 It scales permitted emissions according to vehicle mass. This fails to encourage the use of lighter weight materials.

A better scheme would be to scale according to mass carrying capacity (where known, which it is for all but the lightest vehicles).

1.2 The lower end “breakpoint” arranges that vehicles below a certain mass all enjoy the same emissions cap. This allows gas guzzlers to be offset by super light vehicles earning excess emissions allowances.

We recommend either eliminating the lower breakpoint or, at the least, maintaining a positive gradient below it instead of flatlining.

By whatever algorithm the permitted emissions are to be scaled by vehicle size, the tendency to oversized vehicles needs to be halted and reversed. This is both to reduce emissions and to improve the safety of other road users.
Despite the Australasian New Car Assessment Program’s standards for the protection of other road users, larger cars significantly elevate the risk. A mere 10cm. increase in front-end height can elevate the risk of pedestrian death by 22%, with impacts more likely occurring at critical injury points like the chest or head.
https://www.sciencedirect.com/science/article/pii/S2212012224000017

Studi es have shown a correlation between the surge in larger vehicle sales, such as SUVs, and an increase in pedestrian fatalities in the United States.
https://www.sciencedirect.com/science/article/abs/pii/S2212012221000241

Childr en are eight times more likely to die when struck by an SUV compared to lighter and smaller cars.
https://www.sciencedirect.com/science/article/abs/pii/S0022437522000810

2 . EV charging
2.1 A major barrier to EV uptake in cities is lack of off-street parking. Charging across footpaths is fraught, even illegal.
Standards are needed by which such charging is permitted, with suitable precautions, wherever public charging points are too few or too far.
Local councils may need to be indemnified.

2.2 There are also barriers to charging in carparks of apartment complexes. In part, this arises from the risk of fire.
A national certification scheme for car battery models may help ease concerns.

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

As noted above.

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 noted in section 3.2 of the Consultation Roadmap, an important drawback with electric heavy vehicles is the additional road damage from the battery weight. This would be ameliorated by smaller, swappable batteries with swap stations at sufficient frequency. The question to be resolved is whether the swaps can be made efficient enough.

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: Hydrogen fuel cell
3: Low carbon liquid fuels

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

On the face of it, battery swap appears the most promising. It minimises refuelling time, so permitting shorter journey legs and hence lighter batteries.
The first step in choosing the path ahead should, of course, be a full analysis of the costs of the various options:
- Road damage, including carbon footprint of repair
- Battery swap/recharge delay for the driver
- Battery swap service cost
- Fuel cost
- Amortised infrastructure cost and maintenance
- Pollution cost, including social cost of carbon
- …

Timescale matters too. The sooner emissions are cut the better. Which options can be rolled out at scale in the near term?
Unfortunately, we do not have ready access to such details.

Looking at the international scene, we note that many more models of battery heavy vehicles are available than of fuel cell, and the gap shows no sign of closing.

https://globaldrivetozero.org/tools/zeti-data-explorer/

We suggest that, even if fuel cell has some particular advantage in the Australian context, aligning with the international trend has a significant benefit.
With regard to battery swap in particular, we note this remark in the Consultation Roadmap:
"… adoption of battery swapping trucks also has barriers, including the lack of uniform standards for battery design and increased charging service fees making battery swapping less economical."
The latter objection is at odds with the claim by one observer that the overall running cost is lower than for Diesel, with a conversion cost payback of as little as 12 months. We recommend further research to establish the truth.
https://www.fleetcare.com.au/news-fleettorque/electric-vehicles/aussie-co mpany-offers-truckers-a-battery-swapping

The standards issue suggests a role for the Federal Government.

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

As little as possible. The world's carbon budget for a 1.5°C warming cap is exhausted. Merely "low" carbon is no longer good enough. LCLF should be considered a temporary option where and while alternatives, including 'avoid' and 'shift', are prohibitive.

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?

The proposed pathway is all carrot and no stick. The legislated New Vehicle Efficiency Standard does not apply to heavy vehicles.
Meanwhile, the EU has had rules for HGV emissions reduction in place for some while, and recently ramped them up to, compared with 2019:
a 45% emissions reduction by 2030
a 65% emissions reduction by 2035
a 90% emissions reduction by 2040
https://www.consilium.europa.eu/en/press/press-releases/2024/05/13/heavy-du ty-vehicles-council-signs-off-on-stricter-co2-emission-standards/

While the Australian context is somewhat different, limits with penalties will be needed.

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

Yes

37 13.1 Please add details to your response.

Under “Existing policies to reduce rail emissions”, mention is made of the relatively high use of rail by entities covered by the Safeguard Mechanism:
“The policy currently captures a larger portion of the rail freight sector than road freight, which could disproportionately impact freight on rail despite its being a low-emissions mode. There are currently seven rail freight operators and two road freight operators covered by the Safeguard Mechanism.”
This is one example of a general problem in applying the Safeguard Mechanism only to entities above a threshold size: it creates the possibility of an entity escaping the net by unbundling into smaller businesses.
A possible solution would be to extend it to a second tier of entities, even if the mechanism is made simpler and less onerous for that tier.

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.

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

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

In regards to energy consumption, the extra weight of the battery is less of an issue than for road, and regenerative braking should be cheaper to provide per unit load than for road vehicles.
The predictability of the speed profile makes regenerative braking particularly well suited to rail transport.
Battery trains fit well as a cross-over between electrified and not-yet-electrified portions of the network.
On the other hand, the battery train market is predicted to grow at 4.6% to 2030, the hydrogen fuel cell train market at 11.5%.
https://www.marketsandmarkets.com/Market-Reports/train-battery-market-6068646.html https://www.globenewswire.com/en/news-release/2024/03/26/2852666/28124/en/Global -Hydrogen-Fuel-Cell-Train-Market-Set-

to-Surge-at-a-11-5-CAGR-through-2030-Industry-Projections-Highlight-Robust-Growth.html

Generating green ammonia and green hydrogen helps to utilise surplus solar power during the middle of the day. This will become more valuable as solar generation increases.
A big unknown is the future costs of the alternatives. There is good reason to hope that technology advances will significantly lower the costs of batteries, green hydrogen and green ammonia over the next few decades; it is much less clear which will progress the fastest.

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

None. The world's carbon budget for a 1.5°C warming cap is exhausted. Merely "low" carbon is no longer good enough.

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.

There are concerns regarding the use of ammonia as a fuel. Policing that leaks and nonoptimal combustion do not result in worse climate impacts and pollution than Diesel may be problematic in the maritime context.
https://cleantechnica.com/2024/07/13/study-finds-health-risks-in-switching-ship s-from-diesel-to-ammonia-fuel/

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?

Yes

52 21.1 Please add details to your response.

No mention is made of avoiding emissions by simply not approving infrastructure projects that will tend to increase emissions over, say, a fifteen year time frame. That should be the immediate step in Figure 20.

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?

With many aspects of the transition to a low carbon economy it is hard to keep up with the pace of technological developments, and this applies to road building and repair.
https://www.rmit.edu.au/news/all-news/2024/may/fly-ash-concrete
https://www.bbc .com/news/articles/c1069y05zmeo
https://www.westminster.gov.uk/news/council-paves-way-new-recycled-roads
https://www.agg-net.com/resources/articles/asphalt/building-roads-of-the-future
https://reneweconomy.com.au/worlds-first-wind-turbine-foundation-poured-from-decarbonised-concrete/
Government bodies will need to stay alert to these and react swiftly, taking occasional risks.
In particular, these activities need to be within the remit of ARENA and the CEFC.

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?

As noted above, LCLF should be considered a temporary option for heavy road vehicles

where and while alternatives, including “avoid’ and ‘shift’, are prohibitive.

57 25. What are the best ways for the Australian Government to work collaboratively with industry, business, governments and communities to implement the proposed pathways?

Not answered

58 25.1 What are good domestic or international examples of partnership and collaboration on transport and transport infrastructure emissions reduction that could inform the final Roadmap and Action Plan?

Not answered

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

The EU has hitherto been the leader, with Australia a long way behind. The first concern should be to catch up. However, given the recent shifts in EU politics, some of the more ambitious proposals may be shelved or delayed. This may give Australia an opportunity to show leadership by adopting some of those proposals.

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?

I had prepared my response as a document, including charts, tables and indented paragraphs. It was annoying having to discard all that and enter it as plain text.

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?

"Table 1: How the transport sectoral plan connects with the other five sectoral plans" omits EVs as storage.
The structure of the questions compartmentalises answers within transport modes, discouraging consideration of 'shift' strategies.

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

20240726 submission net zero transport.docx

69 Upload a submission

Not answered

70 Upload supporting file

Not answered

71 Upload supporting file

Not answered

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Rozelle NSW 2039
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ABN: 31 258 840 648

To the Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Transport and Infrastructure Net Zero Consultation Roadmap

Submission

Climate Change Balmain-Rozelle (CCBR) is an independent community group in inner west Sydney with over 900 supporters. We campaign to promote local and national action to reduce fossil fuel use, increase the adoption of renewable energy, and head off catastrophic global warming.

General Observations

- Avoid and shift elements

  Despite the intent of a three-pronged *avoid-shift-improve* framework, the structure of the Consultation Roadmap leads to an emphasis on reducing emissions from each mode independently.

- Carrot versus stick

  While we appreciate the political difficulty of raising the price of high-emissions activities, it is not always possible to achieve a desired change by carrots alone. It is hard, for example, to reward people for avoiding journeys without risking exploitation.

- System wide vision

  Ideally, the starting point should be a long term vision for how the sector as a whole will operate, and how it will interoperate with other sectors, particularly electricity.

  Next is to lay out a path to that, which will be a trade-off between arriving at it in the least time and effort and, on the other hand, achieving rapid emissions reductions in the near term.

Answers to questions posed in the Consultation Roadmap

1. Do you agree with the proposed guiding principles?

Mostly.

1.1. Please add details to your response.

As noted above, a system wide vision is needed as a guide.

For example, the division and linkage between rail transport and road transport: Will further road building be a stranded asset? How should the “last mile” be handled?

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

Yes.

2.1. Please add details to your response.

Efficiently driving the shift to lower carbon options requires a 'carbon-level playing field'. If option A is lower emissions than option B then there needs to be a corresponding incentive, as some combination of subsidies for A and penalties for B.

Given the political risk around any form of 'carbon tax', the temptation is to stick to what are effectively subsidies. Not only is that expensive for the taxpayer, it does not support the 'avoid' element of the framework. While in principle it might be possible to reward avoided transportation, in the same manner as aspects of the Carbon Farming Initiative reward avoided emissions, it would be even harder to vet than is that scheme.

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

Yes.

3.1. Please add details to your response.

It should not inhibit individual States from going further.

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

- Public transport
  - Buses

    Because of the elevated demand in evening rush hour, there is the opportunity for electric buses that are idle during the day to help soak up surplus PV generation; similarly, surplus wind power during the night.

    Some level of coordination may need to be imposed between the statutory energy organisations, the service network providers and the bus companies to maximise the benefits.

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  - Mixed mode

    More attention needs to be paid to integrating transport modes.

- Active transport
  - Commuting

    Fewer Australians commute by cycling or walking than at any time in the preceding fifty years. A team of researchers at RMIT list excellent suggestions for encouraging cycling[1].

    The take-up of ebikes has changed the equation for active commuting. Not only has it become practical for many more people, it has significantly increased the feasible distances.

    Accordingly, more and longer dedicated cycleways are needed radiating from and between the urban centres, particularly where there is no convenient rail link.

    A possible downside is that inclement weather may create a surge of demand for less exposed options and these might no longer be adequate.

  - Local trips

    There are many adjustments to urban design that would encourage less use of cars for shopping and access to local services.

    - Pedestrian precincts in commercial areas

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- Cycle lanes, including counter-flow
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- Lower speed limits
- Footpaths not cluttered by signage and cars parked on pavements

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?

It does not seem possible that the movement of people can contribute to an actual *reduction* in emissions, but changing the way people move could do that. That is covered by public transport, active transport, low emissions transport, shared private transport and a reduced demand for commuter transport.

6. The Australian Government has already engaged in consultation on the 2023 review of the National Freight and Supply Chain Strategy and those consultations will also inform the final Roadmap and Action Plan.

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?

- Shift

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  Likewise, the optimum solution in some cases may be to reduce the freight distance by having a more local source. That solution is not discovered by fully subsidising a lower emissions mode of the existing journey.

  In short, it is impossible to reach the most cost-effective emissions reduction without allowing existing deliveries to become more expensive for the end customer.

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

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7.1. Please add details to your response.

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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?

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  - It scales permitted emissions according to vehicle mass. This fails to encourage the use of lighter weight materials.

    A better scheme is to scale according to mass carrying capacity (where known, which it is for all but the lightest vehicles).

  - The lower end "breakpoint" arranges that vehicles below a certain mass all enjoy the same emissions cap. This allows gas guzzlers to be offset by super light vehicles earning excess emissions allowances.

    We recommend either eliminating the lower breakpoint or, at the least, maintaining a positive gradient below it instead of flatlining.

  - However the permitted emissions are scaled by vehicle size, the tendency to oversized vehicles needs to be halted and reversed. This is both to reduce emissions and to improve the safety of other road users.

    Despite the Australasian New Car Assessment Program's standards for the protection of other road users, larger cars significantly elevate the risk. A mere 10cm. increase in front-end height can elevate the risk of pedestrian death by 22%[3], with impacts more likely occurring at critical injury points like the chest or head.
    Studies[4] have shown a correlation between the surge in larger vehicle sales, such as SUVs, and an increase in pedestrian fatalities in the United States. Children are eight times more likely to die when struck by an SUV compared to lighter and smaller cars[5].

- EV charging
  - A major barrier to EV uptake in cities is lack of off-street parking. Charging across footpaths is fraught, even illegal.

    Standards are needed by which such charging is permitted, with suitable precautions, wherever public charging points are too few or too far.

    Local councils may need to be indemnified.

[2] https://cleantechnica.com/2024/06/26/another-day-another-hydrogen-transportation-firm-sinks-into-its-inevitable-fate/
[3] https://www.sciencedirect.com/science/article/pii/S2212012224000017
[4] https://www.sciencedirect.com/science/article/abs/pii/S2212012221000241
[5] https://www.sciencedirect.com/science/article/abs/pii/S0022437522000810

- There are also barriers to charging in carparks of apartment complexes. In part, this arises from the risk of fire.

  A national certification scheme for car battery models may help ease concerns.

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

As noted above.

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

Partly.

9.1. Please add details to your response.

As noted in section 3.2 of the Consultation Roadmap, an important drawback with electric heavy vehicles is the additional road damage from the battery weight. This would be ameliorated by smaller, swappable batteries with swap stations at sufficient frequency. The question to be resolved is whether the swaps can be made efficient enough.

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.

On the face of it, battery swap appears the most promising. It minimises refuelling time, so permitting shorter legs and lighter batteries.

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

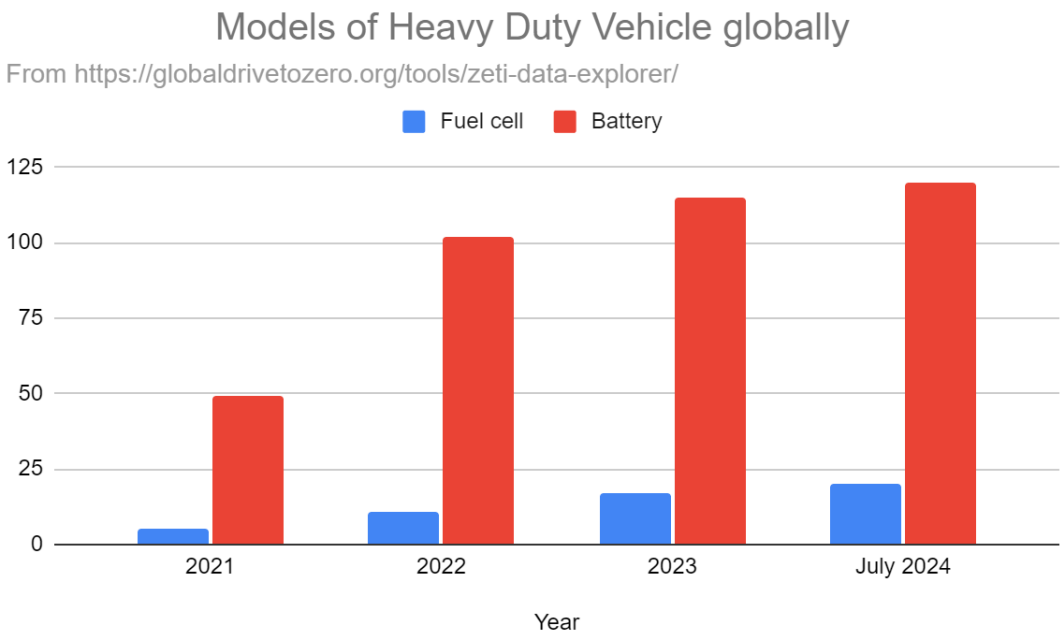
The first step in choosing the path ahead should, of course, be a full analysis of the costs of the various options:

- Road damage, including carbon footprint of repair
- Battery swap/recharge delay for the driver
- Battery swap service cost
- Fuel cost
- Amortised infrastructure cost and maintenance
- Pollution cost, including social cost of carbon
- …

Timescale matters too. The sooner emissions are cut the better. Which options can be rolled out at scale in the near term?

Unfortunately, we do not have ready access to such details.

Looking at the international scene, we note that many more models of battery heavy vehicles are available than of fuel cell, and the gap shows no sign of closing:



We suggest that, even if fuel cell has some particular advantage in the Australian context, aligning with the international trend has a significant benefit.

With regard to battery swap in particular, we note this remark in the Consultation Roadmap:

"… *adoption of battery swapping trucks also has barriers, including the lack of uniform standards for battery design and increased charging service fees making battery swapping less economical.*"

The latter objection is at odds with the claim by one observer that the overall running cost is lower than for Diesel, with a conversion cost payback of as little as 12 months[6]. We recommend further research to establish the truth.

The standards issue suggests a role for the Federal Government.

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

As little as possible. The world's carbon budget for a 1.5°C warming cap is exhausted. Merely "low" carbon is no longer good enough. LCLF should be considered a temporary option where and while alternatives, including 'avoid' and 'shift', are prohibitive.

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?

The proposed pathway is all carrot and no stick. The legislated New Vehicle Efficiency Standard does not apply to heavy vehicles.

Meanwhile, the EU has had rules for HGV emissions reduction in place for some while, and recently ramped them up[7] to, compared with 2019:

- a 45% emissions reduction by 2030
- a 65% emissions reduction by 2035
- a 90% emissions reduction by 2040

[6] https://www.fleetcare.com.au/news-fleettorque/electric-vehicles/aussie-company-offers-truckers-a-battery-swapping

[7] https://www.consilium.europa.eu/en/press/press-releases/2024/05/13/heavy-duty-vehicles-council-signs-off-on-stricter-co2-emission-standards/

While the Australian context is somewhat different, limits with penalties will be needed.

12.1. How would these actions address the identified challenges and opportunities to reduce heavy vehicle emissions?

Driving the shift to lower emissions goods transport entirely by government assistance is a market distortion and fails to support the 'avoid' element. If there are emissions reductions to be had by reducing the demand for such transport then it is appropriate that higher emissions transport be made more expensive.

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

Mostly.

13.1. Please add details to your response.

Under "*Existing policies to reduce rail emissions*", mention is made of the relatively high use of rail by entities covered by the Safeguard Mechanism:

> "*The policy currently captures a larger portion of the rail freight sector than road freight, which could disproportionately impact freight on rail despite its being a low-emissions mode. There are currently seven rail freight operators and two road freight operators covered by the Safeguard Mechanism*."

This is one example of a general problem in applying the Safeguard Mechanism only to entities above a threshold size: it creates the possibility of an entity escaping the net by unbundling into smaller businesses.

A possible solution would be to extend it to a second tier of entities, even if the mechanism is made simpler and less onerous for that tier.

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.

Without access to a detailed analysis of the likely costs, it is hard to judge, but it appears to us likely that battery electric is a good choice for rail in the short term.

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

In regards to energy consumption, the extra weight of the battery is less of an issue than for road, and regenerative braking should be cheaper to provide per unit load than for road vehicles.

The predictability of the speed profile makes regenerative braking particularly well suited to rail transport.

Battery trains fit well as a cross-over between electrified and not-yet-electrified portions of the network.

On the other hand, the battery train market is predicted to grow at 4.6% to 2030[8], the hydrogen fuel cell train market at 11.5%[9].

Generating green ammonia and green hydrogen helps to utilise surplus solar power during the middle of the day. This will become more valuable as solar generation increases.

A big unknown is the future costs of the alternatives. There is good reason to hope that technology advances will significantly lower the costs of batteries, green hydrogen and green ammonia over the next few decades; it is much less clear which will progress the fastest.

[8] https://www.marketsandmarkets.com/Market-Reports/train-battery-market-6068646.html
[9] https://www.globenewswire.com/en/news-release/2024/03/26/2852666/28124/en/Global-Hydrogen-Fuel-Cell-Train-Market-Set-to-Surge-at-a-11-5-CAGR-through-2030-Industry-Projections-Highlight-Robust-Growth.html

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

None. The world's carbon budget for a 1.5°C warming cap is exhausted. Merely "low" carbon is no longer good enough.

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

Yes, with reservations.

17.1. Please add details to your response.

There are concerns regarding the use of ammonia as a fuel[10]. Policing that leaks and nonoptimal combustion do not result in worse climate impacts and pollution than Diesel may be problematic in the maritime context.

21. Do you agree with the proposed net zero pathway for transport infrastructure?

Partly.

21.1. Please add details to your response.

No mention is made of avoiding emissions by simply not approving infrastructure projects that will tend to increase emissions over, say, a fifteen year time frame. That should be the immediate step in Figure 20.

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?

With many aspects of the transition to a low carbon economy it is hard to keep up with the pace of technological developments, and this applies to road building and repair[11,12,13,14,15]. Government bodies will need to stay alert to these and react swiftly, taking occasional risks.

In particular, these activities need to be within the remit of ARENA and the CEFC.

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

As noted above, LCLF should be considered a temporary option for heavy road vehicles where and while alternatives, including "avoid' and 'shift', are prohibitive.

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

28.1. Is there anything missing? Are the sections appropriately integrated? Is the Roadmap appropriately ambitious?

- *"Table 1: How the transport sectoral plan connects with the other five sectoral plans"* omits EVs as storage.
- The structure of the questions compartmentalises answers within transport modes, discouraging consideration of 'shift' strategies.

[10] https://cleantechnica.com/2024/07/13/study-finds-health-risks-in-switching-ships-from-diesel-to-ammonia-fuel/
[11] https://www.rmit.edu.au/news/all-news/2024/may/fly-ash-concrete
[12] https://www.bbc.com/news/articles/c1069y05zmeo
[13] https://www.westminster.gov.uk/news/council-paves-way-new-recycled-roads
[14] https://www.agg-net.com/resources/articles/asphalt/building-roads-of-the-future
[15] https://reneweconomy.com.au/worlds-first-wind-turbine-foundation-poured-from-decarbonised-concrete/

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

Submission prepared by Derek Bolton
on behalf of the CCBR Committee

26/7/2024