

Transport and Infrastructure Net Zero Consultation Roadmap

Take the survey


Department of Climate Change, Energy, Environment and Water

Response received at:

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Yes
- 5 First name
Anna
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- 9 Who are you answering on behalf of?
Organisation
- 10 Organisation name
Clean Energy Council
- 11 What best describes you or your organisation?
Industry
- 12 What sector do you represent?
Energy
- 13 What state or territory do you live in?
Victoria
- 14 Postcode
3000
- 15 What area best describes where you live?
City
- 16 1. Do you support the proposed guiding principles?
Not answered
- 17 1.1 Please add details to your response.
Not answered
- 18 2. Do you support the use of the avoid-shift-improve framework as a tool to identify opportunities for abatement?
Not answered

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

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

decarbonisation?

Not answered

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

Not answered

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

Not answered

37 13.1 Please add details to your response.

Not answered

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

Not answered

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

Not answered

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

Not answered

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

Not answered

42 16.1 How would these actions address the identified challenges and

opportunities to reduce rail emissions?

Not answered

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

Not answered

44 17.1 Please add details to your response.

Not answered

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

Not answered

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

Not answered

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

Not answered

48 19.1 Please add details to your response.

Not answered

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

Not answered

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

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

- 65 29. Is there any further information or documentation that you wish to be considered with your submission?
Not answered
- 66 Would you like to upload a document?
Yes
- 67 Have you removed any identifying information from your submission?
Yes
- 68 Upload a submission
Clean Energy Council_Submission_Transport and Infrastructure roadmap_Final.pdf
- 69 Upload a submission
Not answered
- 70 Upload supporting file
Not answered
- 71 Upload supporting file
Not answered



6 August 2024

Submission on the Transport and Infrastructure Net Zero Consultation Roadmap

The Clean Energy Council (the 'CEC') welcomes the opportunity to provide feedback on the Transport and Infrastructure Net Zero Consultation Roadmap.

The CEC is the peak body for the renewable energy sector in Australia. We represent and work with around 1,000 businesses operating in Australia across solar, wind and hydro power, energy storage and renewable hydrogen. Our mission is to accelerate Australia's clean energy transition.

The development of decarbonisation pathways for all sectors of the economy is critical for achieving Australia's legislated commitment of net zero emissions by 2050, as part of accelerating global action and a historic agreement reached at COP28 in December 2023 to 'phase out' the use of fossil fuels.

As discussed in detail in our response to the Electricity and Energy Sector Plan discussion paper, the electricity sector has made substantial progress towards decarbonisation over the last decade and the energy industry is working hard in partnership with all levels of government and key stakeholders to achieve the 82 per cent renewable energy by 2030.

Renewable energy is the foundation of much of Australia's journey to net zero emissions and will be a critical ingredient in the decarbonisation of the transport sector, whose emissions rose by 8.7 per cent between 2022-23, and have increased overall by 19 per cent since 2005. Australia needs urgent policy action to reverse this trend.

The most important decarbonisation strategy for transport is the electrification of light passenger and commercial vehicles, underpinned by renewable energy and storage. Accelerating the uptake of electrified transport technologies, wherever feasible, can deliver energy efficiency gains and lower consumer costs across the economy.

We acknowledge the important and substantial progress of the Albanese Government in developing and adopting the New Vehicle Efficiency Standard (NVES), which will play a critical role over time in driving down emissions and increasing uptake of lower-emissions and electric vehicles. This standard will need a wide range of supporting government actions over a sustained period in order to accelerate consumer uptake and achieve the Government's interim target of 50 per cent of passenger vehicle sales being EVs by 2030.

In complement to this central focus on the electrification agenda, there is an urgent need for Australian governments to now expand their focus to the heavy transport segments of the sector – ground, air and sea – which are more difficult to electrify, and will require a wider range of decarbonisation pathways – primarily renewable/low-carbon liquid fuels.

Indirect electrification via renewable fuels such as hydrogen and its derivatives of ammonia, methanol and green e-fuels, in addition to the more volume-limited biofuel solutions, represent critical decarbonisation solutions which require significant investment and policy support, in complement to the development of the more volume-limited biofuel solutions.

We welcome the range of funding commitments in the Federal Budget 2024-25 to encourage investment in renewable and low carbon technologies via the 'Future Made in Australia' framework, particularly the Hydrogen Production Tax Incentive scheme and ARENA's \$1.7 billion Future Made in Australian Fund, which can and should assist to bring forward large-scale renewable fuel production capacity in Australia. This now needs to be backed up with a comprehensive policy framework which provides the long-term visibility of emissions reduction trajectories, and the stimulus for producers and users alike to identify and develop the most efficient and practical solutions over time.

The most efficient demand-side policy mechanism is carbon pricing – as Australia well knows from past experience – allocating a cost to emissions and assisting to level the playing field between

environmentally harmful activities and products, and clean alternatives – without requiring significant government expenditure.

While the CEC would like to see the reintroduction of carbon pricing as soon as possible, we recognise that it has low prospects of political support at the present time, and as such, we must also examine alternative policy options, which will necessitate more direct and targeted interventions on both the supply and demand side. These policy responses must be designed and implemented within this decade, with rising levels of ambition over time which can meet our international emissions reduction obligations, while allowing time for industries to develop the necessary responses.

In the remainder of our submission, we highlight that:

- Electrification is the principal solution for many transport categories, and it is available now. The Australian Government must maintain and increase the momentum for wide-spread adoption of across all modes which can be readily electrified, noting the compelling benefits it offers to all electricity consumers. In support of this strategy, it will be critical to continue to grow the supply of renewable electricity generation to meet the increasing demand from electrification.
- We cannot rely on voluntary action to stimulate the adoption of clean energy solutions in the heavy transport/hard-to-electrify sectors. We should establish legislated efficiency standards as well as low-carbon/emissions intensity fuel mandates for the heavy transport sectors which will provide transport operators, technology providers, feedstock providers and clean fuel producers with certainty over the long-term about the trajectory of emissions reduction requirements. This will also create a level playing field for competitors and ensure that market participants aren't penalised for being 'early' movers.

Transport decarbonisation pathways

The development of the Transport and Infrastructure Net Zero Action Plan presents a critical opportunity to establish a holistic policy and investment framework for achieving net zero emissions in the transport sector by 2050.

While we expect that electrification will be the dominant solution for many transport sector segments, policy responses will need to support a range of technologies and solutions to address the different characteristics of the wide range of transport modes which require zero emissions solutions.

Light passenger and commercial vehicles

Private passenger vehicles (cars and vans) used more than 25 per cent of global oil and were responsible for approximately 10 per cent of global energy-related carbon dioxide emissions in 2022¹.

Electrification will be the key decarbonisation pathway for road transport with many consumers already eager to shift to lower emissions alternatives including electric and hybrid vehicles.

As set out by Energy Consumers Australia in its 2023 report, [Stepping up: a smoother pathway to decarbonising homes](#), by 2050 or earlier, '15 million passenger vehicles will need to be "swapped" for electric vehicles with the necessary infrastructure in place to support them'. While this may involve higher upfront costs in the short term, moderate annual savings are expected in the short term, and these grow to in excess of \$1400 by 2030 per household, as shown in Figure 1 overleaf.

Another important finding from the Energy Consumers Australia study was that the adoption of electric vehicles delivers energy savings to all electricity consumers on the grid – irrespective of whether they own an EV or not – due to the fact that electric vehicle uptake results in increased electricity network utilisation, lowering the unit cost for all network users.

¹ [The Role of E-fuels in Decarbonising Transport](#) | IEA



This analysis assumes that the overall EV adoption targets identified by the 2022 ISP Step Change are achieved.

Figure 1: Annual savings from electric vehicles (20-year average) (Energy Consumers Australia, 2023).

While EV uptake will result in greater electricity demand, this is forecast to be manageable. According to the Electric Vehicle Council, 1.5 million passenger EVs on the road in 2030 consuming 10kWh/day, will add in the order of 5.5TWh/annum which is equivalent to a 2 per cent increase on the 265TWh generated and consumed annually². This modest uplift in demand in part reflects the inherent energy efficiency of electrification processes on the whole, as well as the increasing utilisation of behind-the-meter assets like solar and batteries. Investing in the right pricing regime will incentivise consumers to charge their vehicles when the electricity system has capacity for additional demand. This will build immediate flexibility, while the medium to long term focus could be considering the suitability of bi-directional charging and vehicle-to-grid technology.

The 2025 introduction of the NVES is expected to increase the supply of EVs into the Australian market, improving consumer choice, and ultimately encouraging greater uptake. However, as seen by the slowing rate of global growth in EV sales in recent times, Australia cannot take this technology switching for granted, and governments across Australia must continue to invest strongly in supporting infrastructure and public communications and awareness programs. As one of the most effective and readily available strategies for delivering emissions reductions, it is critical that Australian governments maintain a focus on making it easy for consumers to make a cleaner choice.

Battery vehicles are also likely to be a suitable technology for urban buses, smaller logistical vehicles (e.g. forklifts and garbage trucks) and light commercial trucks. It will be critical to encourage small to medium enterprises to trial and adopt electrified alternatives through the provision of loan facilities and grant programs while increasing the availability of zero emissions alternatives

Heavy road transport

The biggest challenge for decarbonising heavy vehicles, is energy density. As the mass of the vehicle increases, so too does the fuel source required to power the vehicle. Therefore, heavy vehicles are expected to be reliant on low-emissions/renewable liquid fuels, while noting that other solutions – such as fuel cell technology – may also play a growing role in time.

We would encourage the Australian Government to adopt broad and durable policy frameworks which provide long-term visibility and predictability to producers and users alike and will enable markets to identify and develop the most efficient and practical solutions over time.

² [Home EV charging and the grid: impact to 2030 in Australia](#) | EV Council

One element of this framework should be the introduction of a New *Heavy* Vehicle Efficiency Standard – like the recent introduction of the New Vehicle Efficiency Standard for light vehicles, which would support the availability of lower-emissions technologies in the Australian market, and could assist switching to low-carbon liquid fuels (LCLFs).

This will need to be complemented by investment in scaling up domestic production of LCLFs. It will be necessary for the Federal Government to support a *range* of suitable LCLF technologies (renewable diesel and hydrogen), production pathways and supporting infrastructure, noting that some pathways – while a helpful part of the early mix of solutions (e.g. biofuels) – are expected to have limited scalability to match projected demand in order to achieve net zero by 2050.

We encourage the Australian Government to consider additional grant programs targeted for demonstration and/or pilot projects for heavy battery electric and fuel cell hydrogen vehicles for remote industries where electrification may not be readily viable. Pilot programs build confidence in emerging technologies and assist adopters to assess both the cost and capability of low carbon alternatives within their daily operations.

Australia has a natural advantage to be a long-term low-cost producer of low-carbon liquid fuels (LCLFs), and the development of this capability is an important strategic opportunity to increase our energy security by reducing our dependence on imports. We commend the Government on its commitment to establish domestic LCLF production capability as this will be key for both domestic decarbonisation and fuel security.

Rail

The decarbonisation of the rail sector will require replacement of diesel fuels with electrified or low carbon liquid fuelled equivalent locomotives. As noted in the consultation paper, Australia's rail transport is relatively low emissions. After moving 57 per cent of national freight and 4 per cent of passenger traffic, rail represented only 4 per cent of transport emissions in 2023. Modal shift from road freight to rail could be a key strategy as part of the final transport decarbonisation action plan.

As locomotives are expensive assets with long lifespans (ranging from 30-50 years), companies will now be considering maintaining, retrofitting or replacing assets that will still be in service past 2050.

Electrified rail is feasible for urban areas but is more challenging for long-distance rail in Australia, and renewable fuel options such as hydrogen-electric (also known as fuel-cell electric) locomotives could be a potential decarbonisation pathway. Locomotives such as Alstom's Coradia iLint³ can travel up to 1,000 kilometres on a single tank of hydrogen, have a shorter refuelling time compared to battery-electric alternatives and require little additional supporting infrastructure.

While most locomotives could switch to renewable diesel, it will take time for domestic production to scale up to meet demand. If companies are left waiting for additional LCLF production capacity, we risk increasing emissions due to the prolonged use of fossil-based diesel.

It will be critical for government to provide a range of financial support to industries to trial and deploy capex-intensive technologies to decarbonise including renewable diesel, electrified rail and hydrogen-electric locomotives.

Aviation

Aviation at present, does not have alternatives that are technologically ready and must have access to large-scale sustainable aviation fuels (SAF) production to decarbonise. International demand will be much higher for SAF past 2050, with projects guaranteed long-term offtake.

The cost of SAF ranges from between two to five times the cost of conventional jet fuel⁴. Although there will be a range of global offtakers for SAF, the gap between what offtakers can, or are willing to, pay, and the cost of production, is considerable. A key focus of government policy must be

³ [Coradia iLint – the world's 1st hydrogen powered passenger train](#) | Alstom

⁴ [Developing a SAF industry to decarbonise Australian aviation](#) | ICF

reducing or bridging the commercial viability gap of low carbon fuels to encourage investment in domestic LCLF projects.

Renewable hydrogen will be a key feedstock for power-to-liquid (PtL) products including ammonia, methanol, renewable diesel and SAF. While the costs of hydrogen-based PtL solutions may be higher in the short term, the costs are projected to decrease over time with the scaling of the hydrogen sector. PtL products also deliver the highest emissions reduction potential over the product lifecycle⁵.

There are a range of policy levers that the Australian Government could pull to promote uptake of clean fuels – from certificate schemes and volumetric targets, to mandates for clean fuel purchasing. According to the World Economic Forum, 75 per cent of total aviation fuel in 2030 will be covered by a regulatory obligation for a mandate or a target with some countries utilising up to 30 per cent SAF⁶.

The CEC considers that there is merit in the Australian Government considering the adoption of a low-carbon fuel mandate in order to provide a level playing field for all airlines, and to give clean fuel producers and aircraft operators long-term certainty in relation to the volumes of clean fuels required over time, to enable the necessary planning and investment decisions.

Airbus, Qantas and ICF's report found that a blending requirement for 5 per cent SAF by 2030 and 28 per cent SAF by 2040 would drive estimated SAF use of 3.5 billion litres by 2040, that would mitigate 9.4 million tonnes of CO2 emissions per year⁷.

Any implementation of mandates would need to include a provision for effective penalties for non-compliance, in order to de-risk LCLF production projects.

Maritime transport

The maritime sector is unique as marine vessels are at sea for long periods and require sufficient fuel storage. LCLFs – specifically renewable diesel, hydrogen, ammonia and methanol – are the most prospective decarbonisation options but current policy settings are insufficient to incentivise LCLF production and consumption.

At the international level, more stringent emissions standards are currently under development, with the International Maritime Organisation's (IMO) commitment to reach net-zero greenhouse gas emissions from international shipping 'by or around' 2050, a commitment to ensure an uptake of alternative zero and near-zero emissions fuels by 2030, as well as indicative check-points for international shipping to reach net-zero emissions for 2030 (by at least 20%, striving for 30%) and 2040 (by at least 70%, striving for 80%).

In addition, the IMO is currently considering mid-term measures to increase emissions reduction, namely:

- a global greenhouse gas fuel standard, and
- a carbon price mechanism (or similar economic measure).

The IMO will meet in September to negotiate the proposed measures to be considered for adoption in 2025.

These outcomes will be relevant to the solutions for the maritime sector in Australia, and Australia should be ready to align its efforts with these international settings at a minimum. This planning should occur through the development of the Australian Government's Maritime Emissions Reduction National Action Plan (MERNAP).

Whatever the outcomes, it's clear that Australia will need to scale up its own low-carbon/renewable fuel production capacity, and planning must begin in earnest for policies which can incentivise both production and consumption of clean fuel alternatives.

⁵ ibid

⁶ [Scaling Up Sustainable Aviation Fuel Supply](#) | World Economic Forum

⁷ [Developing a SAF industry to decarbonise Australian aviation](#) | ICF

These planning efforts will also need to consider the supporting infrastructure requirements at ports and marinas, and the role for strategic public investment. Should Australia be successful in producing internationally competitive clean fuels for the maritime sector, then the vision for ports will need to be an expanded one, with a view to Australia becoming a bunkering hub for low carbon fuels within the region.

Certification of low-carbon liquid fuels

Product differentiation is essential to the success of low-carbon liquid fuels, and the CEC strongly supports the inclusion of LCLFs into the Guarantee of Origin (GO) scheme. LCLFs will only reduce emissions if fuel standard regulations and certification schemes can calculate and certify that the lifecycle emissions footprint is lower than conventional fossil fuels.

We strongly encourage the Government to develop and implement a robust, internationally compatible LCLF standard in collaboration with industry that will facilitate the trading of LCLFs and Product GO certificates.

Credible requirements on the emissions intensity of LCLFs will be critical to ensuring the achievement of legislated federal and state-based legislated emissions reduction targets. Regulations must also avoid the double counting of emissions reduction credits to other schemes.

Conclusion

Following a decade of neglect, Australia has a very large task ahead to quickly establish the holistic policy frameworks that we need to get our transport emissions to net zero within two-and-a-half decades.

We have made a start with the introduction of efficiency standards for passenger vehicles, but we are currently without meaningful plans for the decarbonisation of heavy road transport, rail, aviation and the maritime sectors.

In order to deliver the urgent investment certainty required by transport operators, asset owners, fuel producers and infrastructure (eg. port and airport) owners, we need the forthcoming sector plan to provide clear, long-term, legislated emissions reduction pathways, and the supporting demand and supply side policy mechanisms in order to achieve them.

Hard-to-electrify transport modes need their own efficiency standards. We recommend that the Australian Government also strongly consider the introduction of clean fuel mandates – or an equivalent policy – in order to provide a level playing field for market participants, and to provide visibility to clean fuel producers of the expected demand volumes over time which they will need to scale-up to achieve.

We look forward to a sector plan that is the catalyst for decisive action right across the transport sector, informing the net-zero aligned investment decisions that Australia urgently needs.

Yours sincerely,



Anna Freeman

Policy Director – Decarbonisation