Transport and Infrastructure Net Zero Consultation Roadmap

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Department of Climate Change, Energy, Environment and Water

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5 First name
Mitchell

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Coveney

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9 Who are you answering on behalf of?

Organisation

10 Organisation name

Tourism & Transport Forum

11 What best describes you or your organisation?

Industry

12 What sector do you represent?

All transport
Infrastructure

13 What state or territory do you live in?

New South Wales

14 Postcode

2000

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.

Not answered

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.

Not answered

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

Yes

21 3.1 Please add details to your response.

Not answered

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

Not answered

23 5. What additional actions by governments, communities, industry and other stakeholders need to be taken now and in the future to ensure the movement of people contributes to transport emissions reduction?

Recommendation 4: Deepening the strategy for mode shift as a key decarbonisation lever

 Members are encouraged that mode shift to active and public transport is highlighted as an
important decarbonisation strategy, and that the significant challenges and cost of achieving this
mode shift are acknowledged

 Given the scale of this challenge, much more detail is required on how the Commonwealth
proposes to accelerate mode shift via the “national policy framework for active and public transport”

 With a membership comprised of leading operators (and some funders) of public transport, TTF
would welcome the opportunity to engage directly with the Commonwealth on this policy

 A policy to increase the level of density along key mass transit corridors appears to be a critical

missing ingredient on the current list of possible priorities, as urban density has a clear correlation
with PT viability and mode share

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?

Recommendation 3: Taking a leadership position on development of alternative fuels is crucial for heavy hauls, and key supply chains that will underpin the transition
 As highlighted in the roadmap, it is clear that existing technologies do not yet offer an economic
path to decarbonisation for heavy haul tasks and long-distance travel for rail or trucking
 Therefore, alternative fuels or technologies are going to be required to decarbonise these
transport tasks
 Individual organisations do not have the resources or risk appetitive to take on the significant R&D
and investment required to prove up alternative fuels such as hydrogen
 There is a clear role for Government to lead and invest in the proving up of these technologies to
get them to scale and commercial viability, and establish supply chains if they are sufficiently
competitive
 In a similar vein, Government will need to play a leadership role in developing supply chains for
other key elements required for decarbonisation such as batteries, chargers, electrolysers etc

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?

TTF members strongly support the importance of collaboration particularly between Commonwealth and State Governments (Reflected in Chapter 5 of the roadmap)
3
TTF Submission to Transport and Infrastructure Net Zero Consultation Roadmap (2024)
 The roadmap needs to be much more specific in describing the respective roles of each party in
driving the transition, as too much ambiguity will lead to missed opportunities or gaps

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?

In particular, the Commonwealth has a key role in both coordination of effort, but also driving a
unified approach and sharing the dissemination of best practices and learning across the country

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

Recommendation 11: Deepening the strategy on measurement of decarbonisation
 TTF members support the roadmap aspiration to measure success of the roadmap (Chapter 5.2)
 However, given the highly distributed nature of the transport task, and its mixed public / private
ownership, operation and funding, significant further effort will be required to deliver fit-for
purpose and timely measurement
 Many existing transport data sets are:
- Not collected nationally on a consistent basis
- Do not contain many of the right metrics (particularly those relevant to decarbonisation)

- Are often not reported in a timely manner
- Can be un-reliable or inconsistent between data sets
 Significant and coordinated effort with Commonwealth leadership will be required to create an
effective measurement framework and reporting for decarbonisation

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

Final-Transport-Net-Zero-Roadmap-1.pdf

69 Upload a submission

Not answered

70 Upload supporting file

Not answered

71 Upload supporting file

Not answered

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Tourism & Transport Forum

24th July 2024

Department of Infrastructure, Transport,
Regional Development, Communications and the Arts
GPO Box 594
CANBERRA ACT 2601

Tourism & Transport Forum Submission - Transport and Infrastructure Net Zero Consultation Roadmap

About Tourism & Transport Forum Australia

The Tourism & Transport Forum (TTF) is the peak industry group for the aviation, tourism, transport, and related infrastructure sectors. TTF is a national, member-funded CEO forum, advocating for the public policy interests of our members. TTF represents a broad range of operators which include airports, airlines, tourism, attractions and travel operators, accommodation providers, major events, retail and hospitality businesses, and leading private & public transport operators with a state and national presence. TTF is the leading industry voice and plays an important and active role in advocating for the policy interests of our members. TTF would like to take this opportunity to thank its members for their valuable contributions in shaping our response.

Introduction

The Australian transport industry plays a critical role in the national economy, facilitating connectivity and freight, and making a significant $164.4 billion contribution to domestic GDP in 2020-21 alone[1]. This great scale and size of the industry, also means that it is one of the largest emitters of greenhouse gas emissions. The industry is actively working to decarbonise in a number of measures but there is still a long path forward and is why this roadmap is very important to ensure that industry and government have a clear plan moving forward to reach net zero goals as a collective. Government support, leadership and frameworks are crucial in ensuring that industry has a clear path, alignment and confidence to reach net zero emission target at both state and federal levels. This pathway is also critical with the Australian transport industry facing unique complexities to decarbonise

[1] Australian Bureau of Statistics (ABS) (2023)

compared to other jurisdictions, given our geographical isolation from other parts of the world and population scarcity. This roadmap is not just a mechanism that will set out the long-term strategy for the industry to decarbonise but is an also an opportunity for Australia to be an innovative leader in the energy transition journey which will also result in wider benefits such as job creation, economic growth and greater productivity and efficiencies.

Transport Sector and the Net Zero Journey

TTF welcomes the opportunity to provide feedback Transport and Infrastructure Net Zero Consultation Roadmap and recognises the significant effort and investment in preparing the paper. The Roadmap is comprehensive in covering all modes and tasks and is well structured through introducing useful frameworks and principles. Preparing such a comprehensive document, and seeking feedback is in itself a sensible and necessary step in the decarbonisation journey. TTF would also like to recognise the existing policies and work that have already been initiated by the Federal Government. These Include the New Vehicle Efficiency Standards, National Elective Vehicle Strategy including the EV charging network roll out, the Active Transport Fund and the establishment of the Jet Zero Council. TTF also commends the federal government on the Future Made in Australia plan announced in the 2024-25 Budget, particularly around expanding the Guarantee of Origin scheme and the $1.7 billion announced for net zero innovations including low-carbon liquid fuels. These significant policies are important foundations to the wider transport energy transition and will complement the pathway forward through the Transport and Infrastructure Net Zero Roadmap.

LEK The Road to Net Zero: *Decarbonisation of the Surface Transport Sector*

TTF has been actively involved in advocating for a clear roadmap and pathway forward to enable the transport sector to sustainably decarbonise and welcome the opportunity to be involved in this consultation. With the surface transport industry having greater potential to decarbonise a faster rate compared to other industries, TTF partnered with LEK Consulting in April 2023 to develop The Road to Net Zero: Decarbonisation of the Surface Transport Sector. This innovative report maps out the policy environment for a range of transport modes across both federal and state jurisdictions in Australia and provides recommendations to accelerate decarbonise of the transport sector in a coordinated manner. This report forms the basis of TTF's submission and provides a suite of recommendations and pathways forward for the transport industry to decarbonise.

Recommendations

To compliment the LEK report, TTF has facilitated consultations with industry to understand what the current barriers and challenges (in the present policy environment) are to transition to net zero. From these consultations, a comprehensive set of policy recommendations have been developed to assist the government with facilitation and implementation of the Net Zero Roadmap. A wide cross sector of the transport industry has been represented in forming these recommendations:

Recommendation 1: Coordination between the Commonwealth and state governments

- TTF members strongly support the importance of collaboration particularly between Commonwealth and State Governments (Reflected in Chapter 5 of the roadmap)

- The roadmap needs to be much more specific in describing the respective roles of each party in driving the transition, as too much ambiguity will lead to missed opportunities or gaps
- In particular, the Commonwealth has a key role in both coordination of effort, but also driving a unified approach and sharing the dissemination of best practices and learning across the country

Recommendation 2: Recognising the critical role of both government and industry in decarbonisation

- It is encouraging that the roadmap recognises the importance of partnering with industry who do most of the heavy lifting in surface transport
- However, there is relatively scant detail on how this will be effected across the different modes and tasks
- Clearer and more specific actions and next steps will be important in the next version of the roadmap

Recommendation 3: Taking a leadership position on development of alternative fuels is crucial for heavy hauls, and key supply chains that will underpin the transition

- As highlighted in the roadmap, it is clear that existing technologies do not yet offer an economic path to decarbonisation for heavy haul tasks and long-distance travel for rail or trucking
- Therefore, alternative fuels or technologies are going to be required to decarbonise these transport tasks
- Individual organisations do not have the resources or risk appetitive to take on the significant R&D and investment required to prove up alternative fuels such as hydrogen
- There is a clear role for Government to lead and invest in the proving up of these technologies to get them to scale and commercial viability, and establish supply chains if they are sufficiently competitive
- In a similar vein, Government will need to play a leadership role in developing supply chains for other key elements required for decarbonisation such as batteries, chargers, electrolysers etc

Recommendation 4: Deepening the strategy for mode shift as a key decarbonisation lever

- Members are encouraged that mode shift to active and public transport is highlighted as an important decarbonisation strategy, and that the significant challenges and cost of achieving this mode shift are acknowledged
- Given the scale of this challenge, much more detail is required on how the Commonwealth proposes to accelerate mode shift via the "national policy framework for active and public transport"
- With a membership comprised of leading operators (and some funders) of public transport, TTF would welcome the opportunity to engage directly with the Commonwealth on this policy

- A policy to increase the level of density along key mass transit corridors appears to be a critical missing ingredient on the current list of possible priorities, as urban density has a clear correlation with PT viability and mode share

Recommendation 5: Putting more emphasis on training and skills required to support the transition

- TTF members are already experiencing skills shortages in key employment categories that support the decarbonisation
- Existing higher education and technical training programs are not yet producing anything like the scale of workers to support the transport transition, let alone other sectors of the economy also seeking to decarbonise
- A comprehensive assessment of the workforce requirements needs to be a key element of the transport decarbonisation roadmap in its ultimate form

Recommendation 6: Balancing local manufacturing aspirations with the need for speed and economic efficiency

- TTF members acknowledge and support the push to on-shore significant activity towards decarbonisation
- However, there may in inherent trade-offs and risks in adopting this strategy that need to be acknowledged and addressed
  - Each state pursuing its own local strategy and content rules risks a proliferation of sub-scale and uncompetitive state-based manufacturing facilities. Better coordination of manufacturing at a national level would be strongly preferable, so each state creates a number of specialisations
  - Manufacturing needs to be able to scale quickly and also produce an acceptable product and at reasonable cost. Using battery electric buses as an example, it is not at all clear that scalability, cost or quality of local manufacturers are yet up to the task. This is significantly slowing the transition to Zero Emission Buses
  - By way of example, if a locally manufactured ZE bus is going to cost $900,000 to $1m, and a fit-for- purpose imported ZE bus can be procured for $600-700,000, it will slow progress on decarbonisation by 25-30%
  - Local design rules are also acting as a barrier to creating a level playing field with imports and creating deeper supply chains

Recommendation 7: Recognising the role that emerging technologies will play in decarbonisation

- The roadmap gives relatively little weight to the potential of new forms of transport that can also support decarbonisation

- New modes like eVTOLs, delivery robots, autonomous vehicles and drones could play an important role in the transition and could be given more weight in the roadmap

Recommendation 8: Using incentives and removing disincentives to accelerate the transition

- An important part of accelerating transition will be introducing incentives and removing disincentives
- TTF members observe that existing incentives to accelerate the adoption of electric vehicles do not appear to be sufficient to meet current uptake targets and may need to be sweetened
- Likewise, to meet roadmap aspirations about mode shift on both passenger and freight modes, direct incentives (e.g. IMT / port rail subsidies), or road pricing reform are likely to be necessary, given the long and not very successful history of mode shift attempts over many years for reasons other than decarbonisation

Recommendation 9: Taking action on standards and design rules that are hampering decarbonisation efforts

- Members have observed areas where a lack of standards or regulation are hampering the transition. For example, for electric bus, existing standards are not sufficient to ensure interoperability between bus, charger and software may need to be strengthened
- The ADR that prescribes a maximum bus width of 2.5m (rather than 2.55m) reduces market access for global manufacturers, drives up cost of vehicles and slows adoption of higher standard Euro 6 vehicles
- Furthermore, the ability to oblige OEMs to provide important data on performance is limited, leading to data gaps that will hamper both operational improvement and measurement

Recommendation 10: More clearly recognising the potential complementary between modes

- There are clearly going to be potential synergies between transport modes that will need to be leveraged, and this could be anticipated in the roadmap
- Recognising that technology uncertainty will limit long term planning for a for some modes, there would seem to be several areas where synergy could already be more actively planned, including:
  - Passenger EVs and electric buses
  - Electric buses and light freight vehicles
  - Electric rail networks and both buses and freight vehicles
  - Ensuring there is sufficient electricity network capacity to charge all types of vehicles by geography
- In the future if H_2 emerges as a competitive fuel, synergies between long distance trucking and rail for distribution and supply

Recommendation 11: Deepening the strategy on measurement of decarbonisation

- TTF members support the roadmap aspiration to measure success of the roadmap (Chapter 5.2)
- However, given the highly distributed nature of the transport task, and its mixed public / private ownership, operation and funding, significant further effort will be required to deliver fit-for purpose and timely measurement
- Many existing transport data sets are:
  - Not collected nationally on a consistent basis
  - Do not contain many of the right metrics (particularly those relevant to decarbonisation)
  - Are often not reported in a timely manner
  - Can be un-reliable or inconsistent between data sets
- Significant and coordinated effort with Commonwealth leadership will be required to create an effective measurement framework and reporting for decarbonisation

Conclusion

TTF welcomes the opportunity to provide feedback on the Transport and Infrastructure Net Zero Consultation Roadmap and again thanks members for the valuable contributions and policy insights. TTF would like to acknowledge the partnership with LEK Consulting and sincerely thanks them for their guidance and expertise in formulating this comprehensive response. TTF looks forward to continuing working with the Federal Government as the roadmap is implemented and encourage contacting [redacted] if you have any questions or would like any additional information.

Yours sincerely,

Margy Osmond
Chief Executive
Tourism & Transport Forum

THE ROAD TO NET ZERO

Decarbonisation of the Surface Transport Sector

April 2023

LEK™

TTF AUSTRALIA
Tourism & Transport Forum

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Tourism & Transport Forum Australia (TTF) is the peak industry group for the Tourism, Transport and Aviation sectors. A national member-funded CEO forum, TTF advocates the public policy interests of the leading corporations and institutions in these sectors.

www.ttf.org.au

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Acknowledgements

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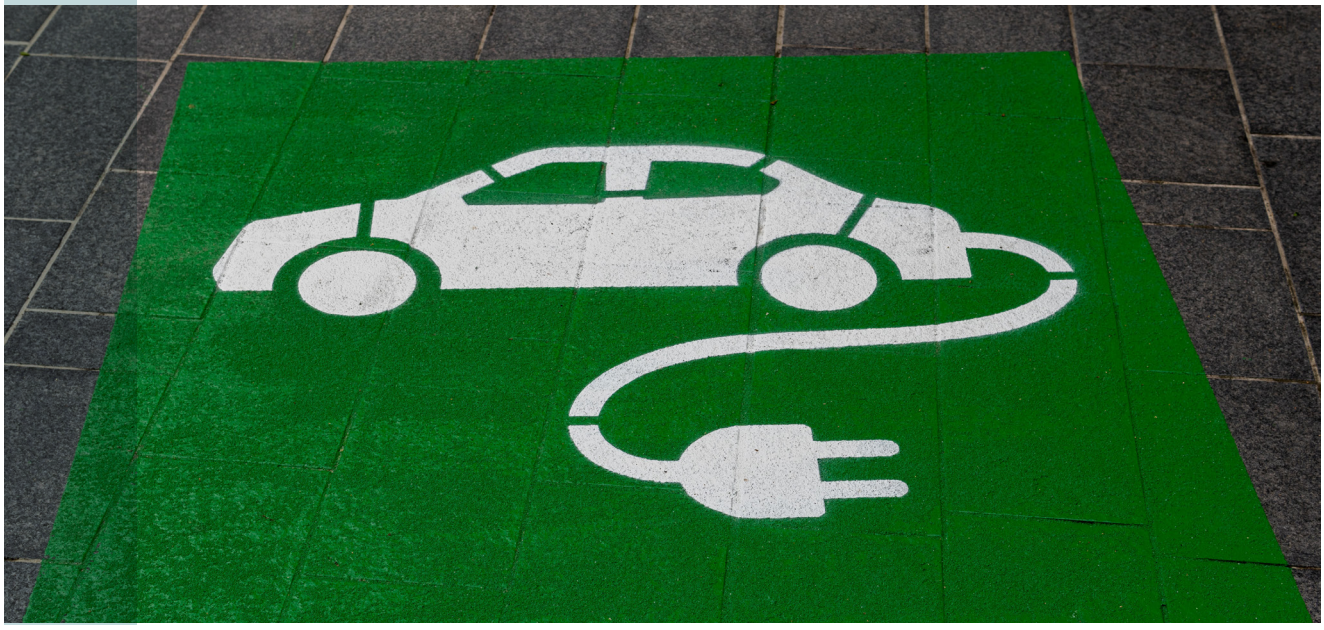
CONTEXT

- The transport sector has a greater potential for early decarbonisation compared with many other sectors of the economy, and can make a material contribution to reaching carbon emission reduction targets by 2030.
- Several transport decarbonisation initiatives have begun, such as a transition to zero emission buses, financial incentives to roll-out charging infrastructure and a national commitment to increase the uptake of EVs. However, current policies and committed investments are unlikely to be sufficient to meet Australia's carbon emission reduction targets.
- This report contains recommendations for Commonwealth and State Governments to consider policy changes that can accelerate the decarbonisation of the surface transport sector.
- This report focuses on decarbonisation of the surface transport industry and acknowledges the importance of embodied emissions in transport infrastructure. The reduction of other greenhouse noxious gases, such as nitrous oxide and sulphur dioxide, is also likely to occur as a consequence of decarbonisation initiatives.



The surface transport sector accounts for a significant c.17% of Australia's CO_2 emissions and has grown by 14% since 2005[5]

- The Australian and State Governments have made commitments to significantly reduce carbon emissions by 2030, with the longer-term goal of achieving net zero emissions by 2050.
- Surface transport makes up a material component of CO_2 emissions in Australia, comprising c.17% in 2022 (September Year to Date). The contribution from Transport has increased over the past 25 years with cars comprising c.50% of transport's emissions and trucks and commercial vehicles comprising 45%.

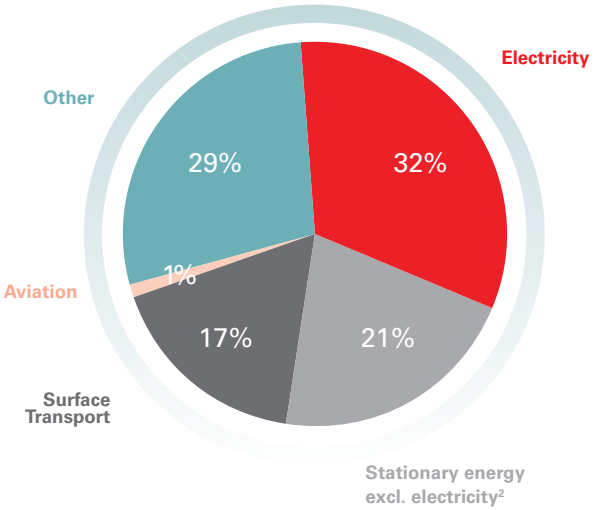
Transportation comprises c.17% of total CO_2 emissions

Australian carbon emissions by sector (2022 SepYTD)[1]

Percentage:

c.17% of Australia's total greenhouse gas emissions come from the surface transport sector

c.14% increase in surface transport emissions from 2005-2021[3]



Current state of motorized transport in Australia

c.20 million registered motor vehicles (c. 26% diesel)

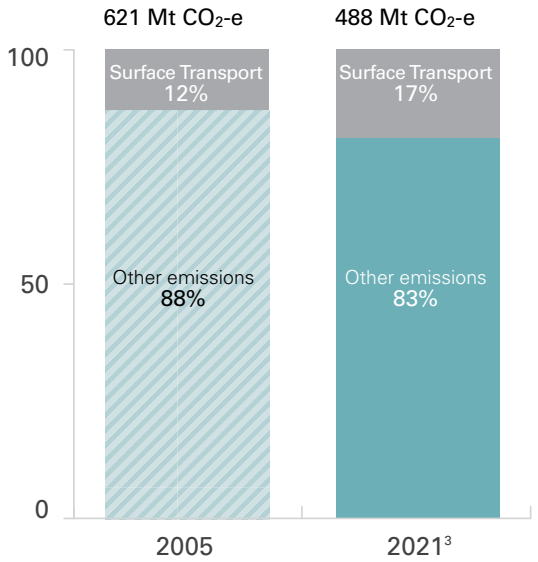
3% EV market share of all passenger vehicle sales in 2022

12% of motorised trips use **public transport**

Cars and trucks comprise c.75% of total transport CO_2 emissions

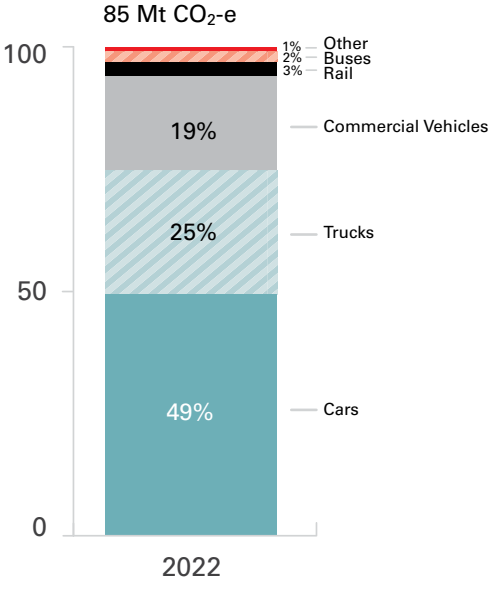
Proportion of surface transport to total emissions (2005; 2021)

Percentage:



Carbon emissions by surface transport (2022 SepYTD)

Percentage:



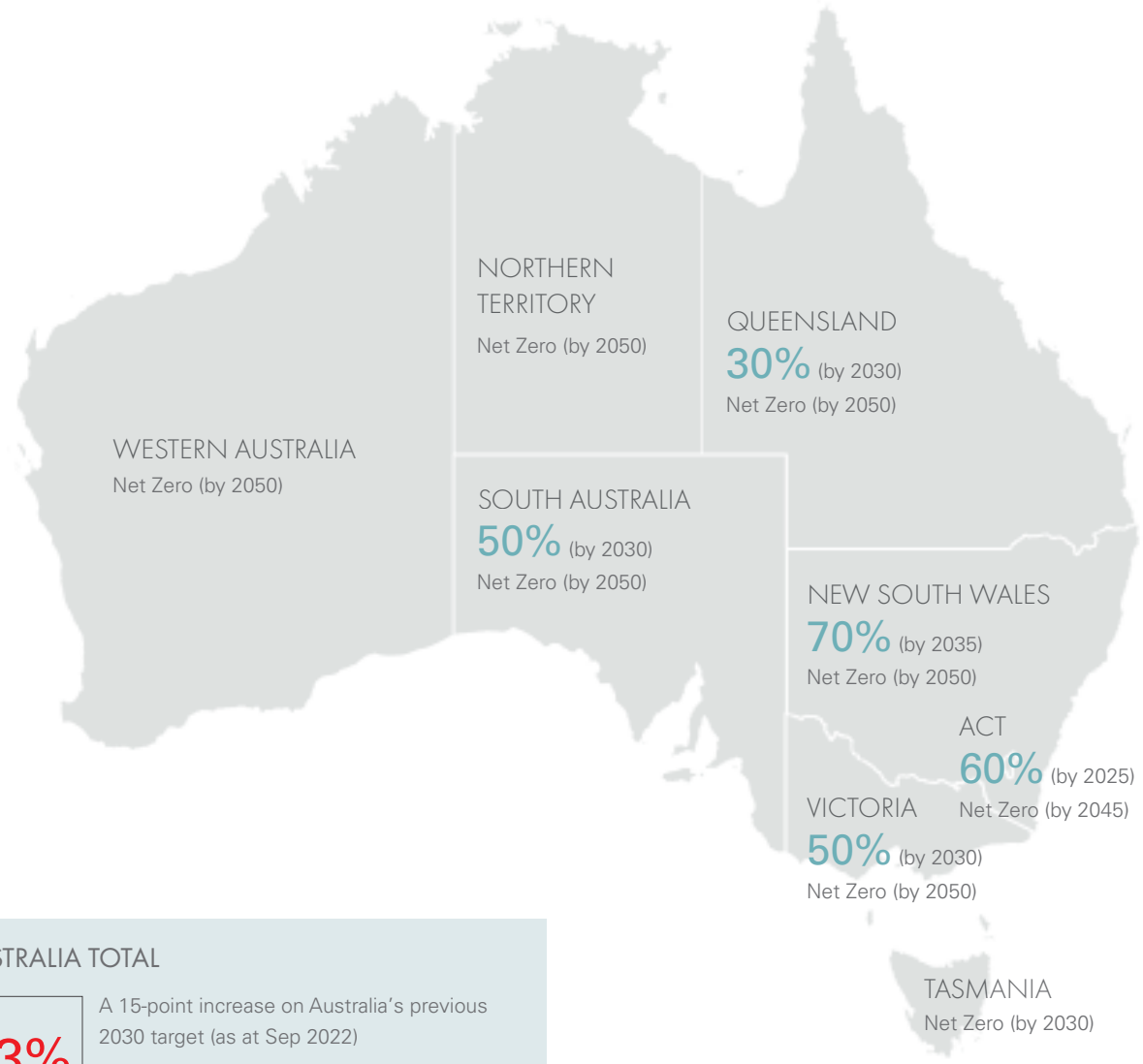
GOVERNMENT GOAL

The Commonwealth Government is targeting a 43% reduction in 2005 carbon emissions by 2030 (as at September 2022), supported by similar state government goals to reach net zero by 2050.[6]

Commonwealth and state government aims for carbon reduction

- As of September 2022, Australia's CO_2 level was recorded at 22% below CO_2 levels[4] in 2005.
- The Commonwealth Government has increased its carbon emissions reduction target to 43% (below 2005 levels) by 2030.
- This is an interim milestone towards Australia's Long-Term Emissions Reduction plan to achieve net zero emissions by 2050.
- Some states and territories have an interim reduction goal (relative to 2005) by 2030. All states and territories are aiming for net zero by 2050 at the latest.

The states and territories have various targets for reaching Net Zero.[7]



AUSTRALIA TOTAL

43%

A 15-point increase on Australia's previous 2030 target (as at Sep 2022)

Australia's Long-Term Emissions Reduction plan is to achieve net zero emissions by **2050**

POLICIES FOR DECARBONISATION[8]

- The level of investment and policies vary considerably between state and Commonwealth governments and by mode.
- Until recently the states and territories have had the most progressive decarbonisation policy positions, each with their respective strategies or roadmaps. These include financial incentives to encourage uptake of passenger EVs, decarbonisation of PT, supporting the use of micro mobility, investing in charging infrastructure and setting government fleet transition targets.
- There has been increasing decarbonisation activity at the Commonwealth level, especially for passenger vehicles. The Commonwealth recently announced a National Electric Vehicle Strategy. It also recently released a National Battery Strategy, and has existing commitments to support charging and refueling infrastructure, grid investment, local industry, and aspirations to be a global hydrogen leader. Collectively, once implemented, these actions will benefit multiple modes.
- Industry has also responded to the challenge, and in some cases taken steps to voluntarily decarbonise (e.g. some passenger service operators), or trial and test new zero emission technologies (e.g. buses).
- Despite these efforts, existing policies continue to fall short of incentives by leading international jurisdictions.

Current policy context and decarbonisation initiatives: Passenger transport modes (Non-Exhaustive)[9]

Transport mode	Commonwealth policy	State initiatives	Industry initiatives
Passenger vehicles 	✔ Financial incentives for EVs including amendments to FBT and import duties ✔ Investments and support for refueling and charging infrastructure ✔ Developed a comprehensive National Electric Vehicle strategy ✔ Support for grid upgrades and increase in local manufacturing ✗ Commitment to introduce a vehicle fuel efficiency standard, but not yet legislated	✔ Various financial incentives, such as stamp duty reductions and rebates/ subsidies ✔ 'Cleaner' mode share initiatives including rideshare and active modes ✔ Initial investments in public charging ✗ Limited progress decreasing use of single occupancy motorised vehicles	✔ Investment in charging and refuelling infrastructure ✔ Voluntary commitments by some hire car and ride share participants to transition to ZEVs ✔ OEMs launching EV models ✗ Prices and supply issues slowing uptake
Buses 	✔ Australian Design Rules regulate bus emissions, mass and vehicle width ✗ These have not yet been amended to accelerate ZEV update	✔ All states have targets for ceasing diesel bus purchases (typically by 2025) ✔ Initial deployments and depot conversions are underway ✗ Fleet transition is not yet fully funded (however, NSW has funded 1,200 ZE buses by 2028)	✔ Most operators are willing to accelerate transition subject to Government funding ✔ Many transit operators have voluntarily set emissions reductions plans ✔ OEMs bringing ZE models to market
Passenger Rail 	✗ No regulations or emission standards in place for non-road diesel engines	✔ Most states procuring zero emissions electricity for metropolitan passenger rail ✔ Some states are designing more efficient trains and rail transport infrastructure ✗ For longer distances, some investment in diesel electric bi-mode rail, but no ZE technology yet viable	
Ferries 	✗ No regulations on fuel standards for the ferry sector ✗ No Commonwealth policy specifically targeting decarbonisation of the ferry sector	✔ Small scale deployment of electric ferries underway ✔ Funding for a pilot to construct and operate a hydrogen ferry	✔ Working in collaboration with the states to deliver small scale trials ✔ OEMs exploring alternative powertrains ✔ Overseas trials of electric and hybrid ferries underway, but the technology is not yet commercially viable at scale

- The focus has been on modes that are easier to decarbonise, such as bus, passenger vehicles and metropolitan rail.
- The biggest policy gaps are currently in the freight sector and the harder to abate passenger segments:
  - there are limited government policies in place to support the decarbonisation of the freight sector, however, early stage infrastructure and technology investments are underway
  - shipping has limited government decarbonisation policy and largely relies on global maritime regulations or industry development
- Furthermore, the construction of Australian transport infrastructure relies on carbon heavy resources such as concrete materials, carbon fuels and diesel transportation vehicles. By example, NSW has developed a Decarbonising Infrastructure Delivery Roadmap to provide guidance on reducing embodied emissions in infrastructure delivery.

Current policy context and decarbonisation initiatives: Freight transport modes (Non-Exhaustive) [10]

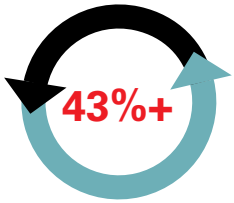
Transport mode	Commonwealth policy	State initiatives	Industry initiatives
Freight Rail 	✗ No regulations or emission standards in place for non-road diesel engines ✔ The two largest freight rail operators are obliged to reduce emissions under the safeguard policy mechanism	✔ Some state regulations of emissions via operator licenses ✗ Limited state plans targeting decarbonisation of freight rail	✔ Freight rail operators are converting fleet to lower emissions diesel and investigating other low and zero emissions alternatives (biofuels, electric, hydrogen) ✔ Electrified freight networks are switching to zero emissions electricity ✗ Low emission technologies are not yet commercially viable
Trucking 	✔ Future Fuels Fund includes funding for enabling infrastructure for battery and hydrogen heavy vehicles ✗ ADR specs not well aligned with emerging international EV truck specifications ✗ Euro 5 standards lag behind more stringent Euro 6 standards globally	✔ Some investments in charging and refuelling infrastructure across many states ✔ Some state governments undertaking trials or setting targets to partly transition their heavy vehicle fleet to hydrogen	✔ Short haul electric trucks beginning to be imported in small volumes ✗ Early deployments of longer haul battery and hydrogen trucks are underway, but not yet widely adopted
Cargo Ships 	✔ Complies with International Maritime Organisation (IMO)'s standards on greenhouse gas reduction measures ✗ No Commonwealth policy specifically targeting decarbonisation of the shipping sector	✔ Early trials and investment to support biodiesel fuel blending ✔ Some states regulate maritime emissions in select areas ✔ Some port authorities have committed to net zero emissions targets	✔ Shipping operator trials of biofuels in partnership with government ✗ Overseas trials of electric and hybrid cargo ships underway, but the technology is not yet commercially viable at scale

ACCELERATING DECARBONISATION

To accelerate decarbonisation of surface transport, further action is required in infrastructure, systems, financial incentives and policy, coordinated across Commonwealth and state governments

- A comprehensive and collaborative approach is required to meet the Government's national targets.
- Commonwealth and state governments have many levers to support the decarbonisation of surface transport.
- A combination of policy, financial incentives, network planning and ecosystem development will accelerate Australia towards its 2030 carbon emission targets. However, we must act quickly.
- Legislative frameworks should be favourable to support zero/low emission fuel development and production, and a watching brief on technology development will be important.
- Governments can support the development of necessary infrastructure to enable clean energy adoption such as EV charging, hydrogen refuelling stations and grid investment. Financial incentives can also drive decarbonisation such as ZEV tax breaks and subsidies to support clean energy adoption and private sector investment.
- Active modes, mobility as a service, micromobility and other last mile technologies should also be explored to reduce the dependence on and number of single passenger vehicle journeys. Micromobility and last mile technologies can also be used to support the decarbonisation of the urban freight task.
- During planning, transport should be considered as a system. A holistic view should be taken to network pricing and ticketing for public transport, roads and other modes.
- Similarly, taking a whole of emissions view towards transport infrastructure will be important to delivering on our net zero commitment.
- To get the biggest impact, it will be important to prioritise high intensity segments, such as rideshare, taxis and freight.
- Lastly, investing in a local industry ecosystem that supports decarbonisation innovation will maximise overall economic benefits.

Six Key Goals For Emissions Reduction



2030 target for CO_2 emissions reduction on 2005 levels

GOALS

1. Reduce emissions intensity of the current fleet

Improve fuel efficiency and quality

Switch to alternative low & zero emissions fuels

Key enablers (non-exhaustive)

- Fuel quality standards
- Robust fuel efficiency standards that align to leading jurisdictions
- Support for zero/low emission fuel development and production
- Procure renewable energy for electrified fleet

2. Transition to lower emissions fleet

Transition fleet

Decarbonise energy sources

Key enablers (non-exhaustive)

- Government fleet transition targets
- Fossil fuel subsidy reform
- ZEV tax breaks & uptake incentives
- ZEV ready building codes
- Charging infrastructure
- Hydrogen production, supply and refueling infrastructure
- Grid investment
- Develop new clean energy sources

3. Shift to lower emissions modes

Decrease use of single occupancy motorised vehicles

Increase use of active transport and micromobility

Key enablers (non-exhaustive)

- Active and public transport investment
- Holistic pricing reform
- Innovative last mile technologies
- Mobility as a Service
- Develop high occupancy vehicle lanes
- Increased micromobility options

4. Reduce inefficient journeys

Change travel patterns

Optimise travel networks

Key enablers (non-exhaustive)

- Placemaking & '20-30 minute cities'
- Land use planning and zoning
- Smart data and integrated transport monitoring and optimisation systems
- Transport pricing & ticketing
- Transition to on-demand or non timetabled transport services
- Route and network redesign

5. Reduce embodied emissions

Evaluate emissions intensity of transport infrastructure

Key enablers (non-exhaustive)

- National infrastructure decarbonisation plan
- Guidelines on use of low carbon materials
- Measurement for embodied emissions across projects

6. Support industry development

Build a local manufacturing and decarbonisation ecosystem

Key enablers (non-exhaustive)

- Investment and support for innovation
- Investment in local manufacturing
- Train and develop skilled workforce

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BARRIERS TO DECARBONISATION

- Barriers to successful decarbonisation vary across the key passenger and freight transport modes.
- Key passenger vehicle barriers include product supply and availability, as well as developing national public charging infrastructure capacity.
- Decarbonisation solutions already exist for buses and are being readily adopted internationally. Upfront capital and capital conviction are key barriers to adoption, along with bus specific charging infrastructure.
- The slow pace of technology development and availability of alternative fuels is slowing the speed of transition for long haul (diesel) passenger and freight rail.
- While battery electric technology is increasingly available for short haul trucking, there are not yet viable commercially viable technologies for long haul. Green hydrogen has the potential to decarbonise longer haul, heavier freight tasks, however, more investment is required to increase the availability and cost competitiveness of green hydrogen
- Similarly, technology for low emissions ferries is currently limited to smaller vessels on shorter routes with limited technological availability to replace large shipping vessels.

STATUS QUO

Several barriers may slow the roll-out of decarbonisation

		Technology availability	Technology maturity & cost competitiveness	Fuel & charging availability	Speed of adoption	Commentary on key barriers
Passenger modes	Passenger vehicles					EV technology is increasingly available, but requires an accelerated roll-out Australia-wide
	Buses					EV technology is readily available, but requires government conviction and upfront capital for deployment
	Passenger rail (electric)					Metro services require cost competitive green electricity
	Passenger rail (diesel)					Long haul diesel services require viable technology alternatives
	Ferries					Requires commercially viable zero emissions technologies
Freight modes	Freight rail					Requires commercially viable zero emissions alternatives to diesel locomotives
	Trucking					Short haul technology is maturing and requires infrastructure investment; Long haul trucking requires viable alternatives
	Cargo Ships					Requires viable alternatives to fossil fuel powered ships

Fully developed  Not developed 

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DECARBONISATION PRIORITIES

- There are several key decarbonisation priorities in the near term that should be considered, with varying levels of impact on passenger and freight transport modes.
- To improve uptake of consumer and commercial ZEV vehicles, greater Commonwealth, state and local government alignment on policy and financial incentives, and urban planning is required.
- To support ZEV uptake, Australia needs to implement stricter vehicle and fuel standards, including for buses, passenger vehicles and heavy vehicles to align with global emission standards and accelerate adoption of the latest ZEV models.
- To improve freight decarbonisation, greater national coordination would be valuable in the preparation of a freight decarbonisation plan that can influence all freight transport modes.
- Specific policies should be introduced to reduce the heavy reliance on embodied emissions in transport infrastructure to direct investment and construction.
- Finally, common to most modes is the need to increase the availability of renewable energy (such as green electricity and hydrogen fuels) as well as a local supply chain and manufacturing capabilities to provide a runway for long term industry decarbonisation.

There are eight priorities for transport leaders

	Key priorities	Key outcomes	Priority mode/industries
1	Implement robust fuel efficiency standards that are in line with leading jurisdictions	To drive supply and adoption	
2	Support the investigation and deployment of interim and new technologies for hard to abate segments	To enable interim reductions across all segments	
3	Align on policy incentives for ZEVs across Government levels	To drive uptake	
4	Develop a national freight decarbonisation plan	To drive technology deployment across all freight modes	
5	Facilitate greater use of PT and active transport modes	To reduce car travel	
6	Develop a national low emissions manufacturing strategy	To maximise economic benefit	
7	Develop policies to reduce embodied emissions in transport infrastructure	To direct investment and construction	
8	Accelerate the availability of renewable energy	To ensure delivery of transport decarbonisation	

ENDNOTES

1 Year to September 2022

2 Stationary energy includes manufacturing, mining, residential and commercial fuel use; energy is burning fossil fuels to product electricity; other includes agriculture, fugitive emissions, industrial processes and waste

3 2021 is the most recent full year recording of carbon emissions

4 Calculations based on seasonally adjusted, and weather normalized CO_2 emission from Quarterly update of Australia's National Greenhouse Gas Inventory database

SOURCE

5 Department of Industry, Science, Energy and Resources; IEA; CSIRO; Electric Vehicle Council; Department of Climate Change, Energy, the Environment and Water

6 Department of Climate Change, Energy, the Environment and Water

7 Department of Climate Change, Energy, the Environment and Water

8 State Government websites; Department of Industry, Science, Energy and Resources; ABC News; Department for Environment and Water; Department of Land Water and Planning, AdaptNSW

9 ATO; NTC; DELWP; DIT; DITRDC; DITRDC Trainline; Ministers Treasury portfolio; NSW Dept of Planning, Industry and Environment; TfNSW; NSW Energy; Victoria DoT; PTV; QLD Government; QLD Department of State Development; Adelaide Metro; Bus Industry Confederation; Infrastructure Australia; BOC; Uber; Drive News; AFR; Kinetic; Transdev; ABB Company; ABC; EPA; Vline; Keolis Downer; E-ferry project; Hysea3; MF Hydra; Ship technology articles; L.E.K. research and analysis

10 Australian Maritime Safety Authority; DITRDC; ADR; Ministers Treasury portfolio; QLD Government; QLD Department of State Development; SA Government; WA Government; NSW Energy; NSW Port Authority; Bus Industry Confederation; Sydney Morning Heralds; AFR; Rio Tinto; BHP; Brookfield Infrastructure; Pacific National; Grattan Institute; Department of Industry; Climate Council; State Governments; Maritime Executive articles; Offshore energy; L.E.K. research and analysis