Transport and Infrastructure Net Zero Consultation Roadmap

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Department of Climate Change, Energy, Environment and Water

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ACT Government

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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?

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67 Have you removed any identifying information from your submission?

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ACT Government Submission - Transport and Infrastructure Net Zero Consultation Roadmap.docx

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ACT Government Submission

Transport and Infrastructure Net Zero Consultation Roadmap

July 2024

ACT GOVERNMENT

Overview

The ACT Government welcomes the Australian Government's efforts to develop a plan for Australia's transition to a net zero economy and the opportunity to make the following submission to the *Transport and Infrastructure Net Zero Consultation Roadmap* (the Roadmap).

Transport emissions currently account for over 64% of total greenhouse gas emissions in the ACT, making it the single largest contributor to emissions in the Territory. To address this challenge, the ACT Government has sought to improve and decarbonise our public transport system, encourage more active travel, invest in public electric vehicle (EV) charging infrastructure and rapidly expand the uptake of Zero Emissions Vehicles (ZEVs) in the Territory. These actions demonstrate the ACT Government's commitment to the decarbonisation of our transport sector and to the achievement of our legislated target of net zero emissions by 2045.

The ACT Government supports the vision of the Roadmap and the pursuit of an ambitious decarbonisation pathway for Australia's transport and transport infrastructure sectors. To support development of the actions and policies that Government should progress in a final Net Zero Roadmap and Action Plan, the ACT Government wishes to highlight the below issues as key areas for further Commonwealth consideration.

Bidirectional charging

The uptake of EVs in Australia presents both a significant opportunity for the decarbonisation of our transport system and a certain challenge for our energy grid. Uncontrolled charging of EVs is projected to increase peak electricity demand and place unsustainable pressure on Australia's energy grid. We know that the grid won't be able to cope if everyone charges their vehicles at the same time. However, the availability of EV models with vehicle-to-everything (V2X) capabilities and the integration of bidirectional charging in our energy system has the potential to mitigate these challenges and become a key enabler of Australia's energy transition.

The deployment and regulation of bidirectional charging should be brought forward

To realise the benefits of V2X, the national sectoral plan should identify support for bidirectional charging and V2X capabilities as a near-term priority for development, rather than a long-term focus. The ACT Government acknowledges that overcoming the market and regulatory barriers to bidirectional charging will require a concerted effort; as such, considers this should be an immediate focus on the part of Government, industry and market regulators. Delays to this work is expected to exacerbate the system challenges already being experienced.

Taking the ACT as a relevant case study, the high penetration of rooftop solar in the Territory is leading to a growing number of households experiencing overvoltage issues. When more energy is generated from rooftop solar systems than is locally consumed, the excess energy feeding back into the grid can cause the tripping of inverters and the curtailment of solar generation. This in turn results in the loss of feed-in tariff revenue for households.

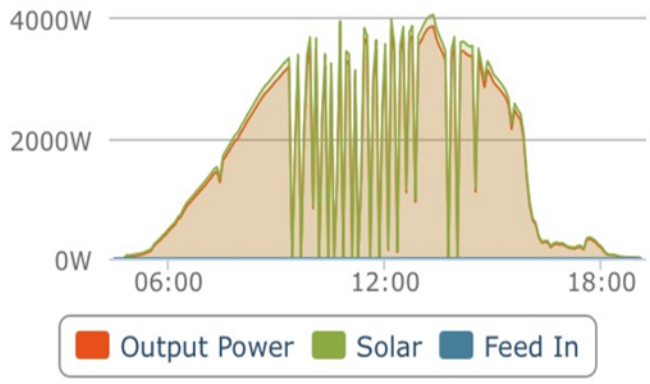

Figure 1 The impact of overvoltage on a household solar PV system in Canberra. In this example overvoltage tripped the inverter dozens of times in the day leading to a loss of generation and feed-in tariff revenue for the household.

The Australian Energy Regulator's *Export Services Network Performance Report 2023* indicates that the percentage of energy network customers experiencing overvoltage issues in the ACT increased from 10% in 2021 to 30% in 2023[1]. Whilst there are several potential solutions to this problem, the deployment of more behind-the-meter (commercial and residential) battery energy storage systems offers the most direct demand management response to this issue.

Unlocking vehicle-to-grid (V2G) capabilities will support grid stability

EV batteries with V2G capabilities can, via bidirectional charging, act as mobile energy storage systems, enhancing the resilience of the local grid.[2] Similar to battery storage systems, V2G technologies can contribute to the grid by balancing local energy supply and demand requirements, providing frequency and voltage control services, avoiding network congestion and deferring the need for infrastructure investment. To realise these benefits however, several technical, policy and economic challenges need to be resolved. These include, but are not limited to:

- The creation of market frameworks that can readily facilitate the participation of distributed energy resources and aggregated EV fleets in frequency control services and other forms of grid support.

[1] Australian Energy Regulator (2023). Export services network performance report: https://www.aer.gov.au/system/files/2023-12/2023%20Export%20services%20network%20performance%20report.pdf, Figure 10 p.18

[2] Amani, A.M., Csereklyei, Z., Dwyer, S., Bai, F., Dargaville, R., de Jong, P., Hargroves, C., Jalili, M., Lu, J., Meegahapola, L., Nagrath, K., Sajjadi, S.S. (2023). My V2X EV: Informing strategic electric vehicle integration: https://racefor2030.com.au/wp-content/uploads/2023/07/V2X-Stage_1_Final-Report.pdf. Prepared for RACE for 2030 CRC.

- Policy and regulatory frameworks that can accelerate the supply and integration of bidirectional charging capable equipment.
- Grid design and planning reforms to support two-way energy flows in the distribution network.
- Consistent standards in communication, data exchange and interoperability procedures.
- Uncertainty regarding the impact of V2G operations on EV battery health.
- Increased supply of V2G capable vehicles to the Australian market; and
- Interactions with state planning and building regulations.

Should such barriers to V2G capability be overcome, bidirectional EV charging has the potential to become the single largest form of flexible storage in Australia's energy system. This proposition is supported through research commissioned by the Australian Renewable Energy Agency in 2023, which asserted that:

> *The usable storage in Australia's EV fleet [in 2050] will be nearly four times total NEM storage requirements. Flexible bidirectional charging from only 10% of this capacity could provide 37% of total NEM storage needs, offsetting around $94 billion of large-scale battery storage investment.*[3]

The case study in Box 1 demonstrates the potential of this technology for Australia's energy system.

Box 1: ACT Case Study: Realising Electric Vehicle-to-Grid Services[4]

Electric Vehicles support grid during major emergency

- On the 13 February 2024, major storms in Victora blew over high-voltage transmission towers west of Melbourne, triggering the disconnection of Loy Yang coal power station and two wind farms.
- As the national energy grid reeled from this disruption, 16 V2G-enabled EVs plugged in to bidirectional chargers at properties across Canberra responded.
- These vehicles stopped charging and quickly switched to discharging their stored power back into the grid, as they had been programmed to do. In total, they provided 107kW of support to the national grid over a 10-minute period. This was the first time in the world such a V2G response to a grid emergency has been demonstrated.

What opportunity does this represent?

- If 105,000 electric vehicles responded in this way to a similar unexpected event, they could cover the typical spare capacity required to balance energy supply and demand requirements

[3] enX (2023). V2X.au Summary Report – Opportunities and Challenges for Bidirectional Charging in Australia. https://arena.gov.au/assets/2023/06/v2x-au-summary-report-opportunities-and-challenges-for-bidirectional-charger-in-australia.pdf. Commissioned by ARENA.

[4] Sturmberg, Bjorn (2024). When transmission lines fell, 16 electric vehicles fed power into the grid. It showed electric vehicles can provide the backup Australia needs: https://theconversation.com/when-transmission-lines-fell-16-electric-vehicles-fed-power-into-the-grid-it-showed-electric-vehicles-can-provide-the-backup-australia-needs-230673

for the entirety of the ACT and NSW. For context, there are already more than 200,000 electric vehicles on Australian roads.

What does this mean for future policy development?

- Realising the potential of V2G technology necessitates the design of grid systems, EVs, chargers, and smart control mechanisms that can meet the needs of both drivers and the electricity system, at the same time.
- If the EVs in the above example kept charging, as virtually all EVs are programmed to do when their energy storage is below a certain level, then this would have directly obstructed the recovery of the energy system.
- V2G technologies can play a critical role securing an all-electric future, provided that EVs and their charging systems are designed to also support the electricity system that powers them.

V2G is a technology proven in trials in the ACT and internationally. Whilst further work is required to unlock the full potential of V2G capability, in its simplest form, bidirectional charging can enable peak demand shaving through vehicle-to-building chargers and access to valuable feed-in-tariffs through wholesale energy retailers, delivering significant support to the grid and value to Australian households. Realising this potential requires prioritisation and the coordination of reforms across Australia's energy and regulatory systems now. Whilst this task is significant, the rewards are also substantial.

Mode shift from road to active travel and rail

Development of a national policy framework for active and public travel is integral to transport decarbonisation

The Roadmap identifies the significant role active and public transport will play in reducing road transport emissions and acknowledges the co-benefits related to health, pollution, congestion and household cost. The ACT Government strongly supports mode shift away from private vehicles and endorses the strategic direction of a national policy framework for active and public travel.

While the 'avoid-shift-improve' framework of abatement is referenced in the Roadmap, the 'improve' aspect of enhanced vehicle efficiencies is much more developed than the behavioural change components of 'avoid' and 'shift'. Yet these components are higher on the framework hierarchy because of their greater emissions reduction potential; as such, there should be greater prioritisation, by all levels of Government, on behavioural change measures to realise the emission reduction outcomes and other co-benefits of increased active travel.

The ACT Government strongly agrees that development of a comprehensive national policy framework for active and public transport will support mode shift and help generate emissions reductions. Such a framework should be a major component of Australia's transport decarbonisation pathway. The establishment of mode share and investment targets is particularly important, as this would accelerate momentum for state, territory, and local governments.

In addition to the actions suggested in the Roadmap, a national framework will need to include elements of behavioural change. This is because the decision to change travel modes is more difficult than using a lower-emissions version of an existing transport mode, not only because it requires innovative and well-

designed infrastructure and corresponding investment but also because it requires individuals to overcome established routines, habits and imagine new lifestyles[5]. Options to support development of an economy of flexible services (e.g., car sharing, micromobility sharing, on-demand mobility services) should also be considered; integration of these services has the potential to reduce car ownership[6].

The ACT Government would also support explicit recognition in the Roadmap itself that uptake of EVs, while reducing emissions, will at a minimum perpetuate car-related issues and at worst, increase private vehicle travel (as people may perceive it as benign). Increased car travel would exacerbate congestion and road safety concerns, potentially leading to increased car-focused road investments such as lane duplications rather than reallocation of road space for public and active transport. This would further disincentivise active travel participation as safety concerns, which are the most significant barrier to active travel, would persist.

The net zero pathway for light vehicles should consider mode shift to faster rail

The ACT Government supports the transition to electric vehicles as the primary decarbonisation pathway for light vehicles. However, consideration should also be given to the opportunity presented by passenger rail to support mode shift away from emissions intensive air travel and private vehicle transport, particularly in the context of inter-city transits. According to the International Energy Agency, rail is the least emissions-intensive mode of passenger transport[7]. Passenger rail travel can reduce emissions by 50-135 grams CO_2 equivalent (up to 80%) per passenger kilometre compared with car travel, depending on the electricity mix and vehicle stock, and by around 86% compared with air travel[8,9].

As a relevant example, the Canberra to Sydney route is one of the busiest inter-capital passenger travel routes in Australia. In 2023, almost 90% of passenger movement between the two cities occurred via private vehicle and less than 7% was by coach or rail[10]. At present, the Canberra-Sydney rail journey takes about 4 hours 20 mins, with car travel just over 3 hours. Faster rail (typically between 160 to 200km/hr) poses a significant opportunity to improve travel times and make rail travel competitive with car travel between Canberra and Sydney. Investment in and mode shift to faster rail would result in substantial emissions reductions as well as play a role in servicing domestic and international tourism, supporting better social and economic outcomes in the region, decreasing traffic congestion and accidents on major highways and improving regional connections as part of a broader national network. Unlike high-speed rail,

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[5] IPCC (2022). Demand, services and social aspects of mitigation. In *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter05.pdf

[6] Hensher, D. A., Ho, C. Q., & Reck, D. J. (2021). Mobility as a service and private car use: Evidence from the Sydney MaaS trial. *Transportation Research Part A: Policy and Practice*, *145*, 17-33.

[7] International Energy Agency (2023). Rail: https://www.iea.org/energy-system/transport/rail

[8] Australasian Rail Association (2020). Value of Rail 2020: https://ara.net.au/wp-content/uploads/REPORT-ValueofRail2020-1.pdf

[9] UK Government Department for Energy Security and Net Zero (2022). CO2 emissions of transport modes – processed by Our World in Data, originally sourced from: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022

[10] Bureau of Infrastructure and Transport Research Economics (2023). Australian Infrastructure and Transport Statistics Yearbook 2023: https://www.bitre.gov.au/sites/default/files/documents/bitre-yearbook-2023.pdf

which is subject to significant cost and feasibility challenges, rail line upgrades for faster passenger rail can be progressively implemented now, at reduced cost, and would result in emissions reductions sooner.

Freight movement by rail rather than road is preferred

The ACT Government supports the Roadmap's preference for freight to be increasingly moved by rail rather than by road. Road is the primary mode of freight delivery to and within the ACT; while the ACT has no plans to increase the rail network within the Territory, a shift to rail freight movement between cities to local distribution hubs would bring about reduced scope 3 emissions for the ACT and would complement our transition to zero-emission last mile delivery.

Conclusion

Reducing transport emissions is a significant challenge and the development of a clear and robust pathway forward will help guide collective effort across the country. The ACT Government believes the final Transport and Infrastructure Net Zero Roadmap and Action Plan could be further strengthened through consideration of the issues raised in this submission. Bringing forward deployment and regulation of bidirectional charging, pursuing development of a national policy framework for active and public travel and increasing the role of rail in both passenger and freight movement will help ensure that decarbonising Australia's transport system and realising net zero targets is achievable.