ACRS Policy Position Statement
Climate Change and Road Safety

Summary

Climate change is happening now and will continue to occur into the near to medium future, affecting the safe operation of the road transport system. Current and future climate change will have increasing adverse health impacts and reduce road safety. Life and health are not exchangeable for other benefits in society (e.g., economic or efficiency). As one of the key contributors to greenhouse gas emissions, the road transport system must adapt to address the causes of climate change and the consequences for road trauma. Both are preventable and must be addressed by improving the design and management of the road transport system. Active travel for pedestrians and cyclists, eRideables[1] and public transport options must be prioritised to decarbonise the road transport system and benefit road safety.

Key policy positions

1. Governments should implement the Intergovernmental Panel on Climate Change (IPCC) recommendations because unmitigated climate change will result in road traffic injuries and other direct health and economic impacts.
2. Governmental action must: address the causes of climate change and the consequences of climate change; and respond to climate change-induced challenges to the safe operation of the road transport system and opportunities for improved road safety in the road transport system, both in the immediate and longer term.
3. Governments must immediately invest in infrastructure prioritising and promoting pedestrian travel and cycling, active and eRideables travel, public transport, and sustainable freight options, and act to disincentivise personal fossil fuel-based transport.
4. To encourage active travel, speed limits of 30km/h with supporting infrastructure should be implemented in residential and high pedestrian and cycling activity areas

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[1] eRideables, or Personal Mobility Devices (PMDs), include electric scooters, electric unicycles, etc..

Policy problem

Climate change is a significant challenge to the planet, affecting the environment, people's livelihoods, quality of life, and infrastructure.(1, 2) Climate action and good health are equally important Sustainable Development Goals.(3) Climate change and road trauma have interconnected causes, impacts, and policy solutions. Climate change threatens human health via direct impacts and reduces road safety and engagement in active and eRideables transport choices during more frequent extreme weather.

Effects of climate change are seen in changing, less predictable, and more frequent extreme weather events that can result in: (a) flooding, bushfires, storms and blizzards in sections of the road transport system; (b) degradation of road transport infrastructure through landslides, roadway wash away, roadway subsidence, bridge and culvert collapse, etc.; (c) failure of traffic management through traffic signal outages, damage or loss of signage and road markings, guideposts, etc.; and, (d) breakdowns in road transport network security through route closure, driver confusion, freight operator and delivery delays and rescheduling, etc..(4-6) Moreover, weather events may result in road users' decisions to change modes of travel (particularly private motor vehicle use instead of active transport such as walking, cycling and use of eRideables), their times of travel, and to make more risky decisions than might otherwise occur.

The underlying cause of climate change is excessive greenhouse gas emissions, of which the transport sector in Australia is responsible for 17%.(7) Transport emissions have grown more than any other sector, increasing nearly 60% since 1990.(7) Climate change produces more extreme weather events and adverse weather conditions, which can cause road crashes, divert spending into infrastructure maintenance and replacement rather than safety improvements, and discourage the use of more sustainable and safer mobility options such as public transport. Significantly, shifts to public transport and other forms of low emissions transport can enhance health, employment, energy security, and equity.(4)

Principles underpinning ACRS position

- Life and health are not exchangeable for other benefits in society (e.g., economic or efficiency); therefore, the transport system, one of the key contributors to greenhouse gas emissions, must adapt to address climate change and road trauma.
- It is never acceptable that people are killed or seriously injured in the road traffic system.
- Climate change's current and future consequences for health and quality of life are unacceptable and must be addressed through urgent action to mitigate the current and emerging climate change crisis.
- Road safety and climate change prevention must be aligned to maximise benefits for society.

Evidence base

Road safety can benefit from climate action

Public transport is the safest and most energy-efficient form of transportation.(8, 9) Australian research has confirmed that a mode shift from private vehicle to public transport (i.e., train, tram, or bus) for commuting would reduce not only total crashes but also severe crashes.(10) Better public transport access and coverage will also reduce the incidence of risky driving behaviours, such as inattentive and drug driving.(11) Shifting the balance of transport infrastructure, policy, and funding away from private fuel-based transport and towards public transport will prevent road trauma and increase the sustainability of the transport system. As public transport ridership increases, road safety outcomes will improve.

Public transport growth also supports climate action, using less fuel and energy than private car transport. Notably, the success of public transport relies on active and and eRideables transport that acts as a feeder to public transport stops/terminals. The lack of safe active and eRideable infrastructure is a critical barrier to modal shift to public transport and therefore green transport.(12)

The hierarchy of importance of road users in the transport system needs to prioritise active, eRideables and public transport users over private vehicle occupants. This will have important health and safety benefits as it will reduce emissions and increase physical activity. Public and private initiatives to reduce demand for transport such as "working from home" and carpooling are also encouraged to address road safety and climate change.

Decarbonising road transport requires a large-scale shift from gasoline and diesel to biofuels, electricity, or hydrogen, either in dedicated battery-electric or fuel-cell vehicles or mixed configurations, such as plug-in hybrid-electric vehicles. This also promotes the modernisation of the vehicle fleet and a consequential rapid role out of Advanced Driver Assistance Systems (ADAS) technologies that have direct road safety benefits in incident and crash prevention and the protection of road users.(11)

Climate change has a direct impact on road trauma

Analysis of the effect of climate change on road safety is limited due to gaps in publicly available data, including shortfalls in crash and incidence reporting and data collection and no routine systematic root cause analyses of road crashes.(13)

Climate change increases the occurrence and severity of risky weather events, reducing road users' safety.

Climate change is increasing the frequency of heavy rain and heatwave events.(14) An increase in rain is problematic for road safety because it reduces tyre-surface friction, impairs visibility for drivers, and makes vehicle handling more difficult. Greater rainfall frequency is expected to translate into higher collision counts.(15, 16) Heatwaves increase road fatalities.(17) Road pavements deteriorate faster with extreme weather resulting in potholes and other dangerous pavement damage. Advancements in vehicle safety technologies (such as advanced driver support systems) will not necessarily mitigate the increased risk because such technologies often do not work well in weather situations such as rain.(18) These circumstances will also affect active and eRideables users as rain and heatwaves can result in falls, crashes, and health deterioration through heatstroke.

Extreme weather from climate change will also create road hazards and emergency evacuations where motorists may drive in unsafe conditions.

Disaster situations such as bushfires can create significant immediate and longer-term psychological stress for drivers,(19) increasing crash risk.(20, 21) The Country Fire Authority of Victoria dedicated a website to 'Staying safe in the car during a bushfire', noting that *"Car crashes are common in bushfires due to poor visibility"*.(22) Driving through floodwater is highly risky and can result in property damage, injuries, or fatalities.(23)

Climate change has the potential to deteriorate transport infrastructure

Sea-level rise will compromise infrastructure of all types.(24, 25) Bridges due to their long service life are susceptible to evolving climate conditions. The increase in maximum temperature, extreme precipitation events, and sea level rise will have a strong impact on durability, serviceability, safety, and functionality of bridges.(26) Heavy rainfall and subsequent floods can cause long term damage to transport infrastructure.(27) Deteriorated infrastructure contributes to road crashes, and the increased need for

maintenance or replacement which diverts resources from upgrading the safety of the road network or mitigating climate change.(25, 28) It also results in additional emissions due to repair / replacement and additional journey length due to detours. Prevention makes sense: every dollar invested in resilience saves up to $11 in recovery.(29)

Road safety improvements are needed to safely encourage more climate-friendly travel.

Individuals and communities can privately or through policy-based incentives reduce fossil fuel-based transport usage, by active travel or using eRideables devices to travel. These changes to mobility patterns will affect risk exposure and safety outcomes for those not in vehicles.(30) Given the link between fossil fuelled transport, climate change, and road trauma, lowering speed limits will help mitigate climate change and increase road safety.(31) Introducing 30 km/h speed limits for residential areas and better infrastructure for active and eRideables transport should be priorities for governments at all levels.

Road safety practice must evolve to consider climate change

Actions to address climate change can often be preliminary in nature, mainly either the documentation of stakeholder perspectives or some limited modelling or scenario planning.(32) Road safety practice must evolve to promote adaptations to climate change that reduce the risk of road crashes and associated road trauma. Actions can serve the mutual aims of minimising the causes of climate change and the safety and trauma consequences that can flow from climate change impacting with the road transport system.

Potential conflicts between road safety and climate change mitigation need to be managed. For example, trees on roadsides can be deadly in a crash, however, planting and keeping trees is a meaningful way to mitigate climate change, provide shade, and reduce surface temperatures for active and eRideables users, particularly in urban environments.(33, 34)

Transport infrastructure requires significant amounts of natural raw materials. The extraction, transportation, and production of these materials produces waste, consumes energy, and emits greenhouse emissions. Significant benefits can be realised by finding new uses and solutions to reuse, repurpose, and repair civil infrastructure. Recycled, alternative, and sustainable materials can be successfully used in road infrastructure.(35) Road and transport infrastructure must address whole-of-life impacts of asset decisions and their future climatic risks through mitigative and adaptive responses.

Recommended policy actions

1. Governments should implement the recommendations of the IPCC.
2. Governments immediately invest in public transport, active travel, and sustainable freight options, and disincentivise personal fossil fuel-based transport.
3. To encourage active travel, speed limits of 30km/h with supporting infrastructure should be implemented in residential and high pedestrian and cycling activity areas
4. Governments invest in infrastructure resilience against extreme weather events
5. Governments invest in developing community resources to address the risks associated with extreme weather events, including but not limited to risk maps for flooding and bushfires that include evacuation routes, education about warnings and related communications, etc.
6. The use of sustainable and recycled materials should be prioritised for all road and transport infrastructure projects.
7. The private sector should be appropriately taxed according to their contribution to the social and economic costs of emissions.

8. The private and public sector should encourage sustainable transport for work-related travel and commuting.
9. Community organisations should advocate to governments for climate adaptation initiatives and take responsibility for their contributions to climate change.
10. Individuals need to prioritise public transport and active and eRideables travel options over private fossil fuel-based transport.

ACRS actions

1. Raise awareness of the relationship between climate change and road safety.
2. Advocate to road safety stakeholders to consider the impact of climate change and road safety.
3. Support the development of the knowledge base for strategies to increase road safety considering climate change.

References

1. Naughtin C, Hajkowicz S, Schleiger E, Bratanova A, Cameron A, Zamin T, et al. Our future world: Global megatrends impacting the way we live over coming decades. https://www.csiro.au/en/research/technology-space/data/Our-Future-World: CSIRO; 2022.
2. Cresswell I, Janke T, Johnston E. Australia: State of the Environment 2021. Overview. https://soe.dcceew.gov.au/overview/introduction: Australian Government; 2021.
3. United Nations Department of Economic and Social Affairs. Sustainable Development https://sdgs.un.org/goals: UN; [cited 2022 20 July]. Available from: https://sdgs.un.org/goals.
4. IPCC. Summary for policymakers [H.-O Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S.Löschke, V.Möller, A. Okem (eds)],. In: Pörtner H-O, Roberts DC, Tignor M, Poloczanska ES, Mintenbeck K, Alegría A, et al., editors. Climate change 2022: Impacts, adaptation and vulnerability Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf: Cambridge University Press; 2022.
5. Gaffney J, Hovenden E. Towards linking climate and weather phenomena to road safety outcomes Part 1 of 3: The collective involvement of weather manifestations. Journal of Road Safety. 2022;33(3):5-15.
6. IPCC, editor. Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change. https://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/: Cambridge University Press; 2012.
7. Department of Industry Science Energy and Resources. Quarterly update of Australia's National Greenhouse Gas Inventory: September 2021: Incorporating emissions from the NEM up to December 2021. https://www.industry.gov.au/sites/default/files/February%202022/document/nggi-quarterly-update-september-2021.pdf: Australian Government; 2022.
8. World Health Organization. Health in the green economy: Health co-benefits of climate change mitigation - transport sector. https://www.who.int/publications/i/item/9789241502917: WHO; 2012.
9. World Health Organization. Global status report on road safety 2015. https://apps.who.int/iris/handle/10665/189242: WHO; 2015.
10. Truong LT, Currie G. Macroscopic road safety impacts of public transport: A case study of Melbourne, Australia. Accident Analysis & Prevention. 2019;132:105270.
11. Hasan R, Watson B, Haworth N, Oviedo-Trespalacios O. A systematic review of factors associated with illegal drug driving. Accident Analysis & Prevention. 2022;168:106574.
12. Sims R, Schaeffer R, Creutzig F, Cruz-Núñez X, D'Agosto M, Dimitriu D, et al. Transport. In: Edenhofer O, Pichs-Madruga R, Sokona Y, Farahani E, Kadner S, Seyboth K, et al., editors. Climate change 2014: Mitiagation of climate change Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press; 2014.
13. Australasian College of Road Safety. ACRS Policy Position Statement: Data and Information Needs. https://acrs.org.au/wp-content/uploads/ACRS-Data-Needs-PPS-2023.pdf: ACRS; 2023.

14. Sandford B. Climate change adaptation and water governance: Background report. https://summit.sfu.ca/item/17667: Simon Fraser University; 2011.
15. Hambly D, Andrey J, Mills B, Fletcher C. Projected implications of climate change for road safety in Greater Vancouver, Canada. Climatic Change. 2013;116(3):613-29.
16. Nazif-Munoz JI, Martínez P, Williams A, Spengler J. The risks of warm nights and wet days in the context of climate change: assessing road safety outcomes in Boston, USA and Santo Domingo, Dominican Republic. Inj Epidemiol. 2021;8(1):47.
17. Wu CYH, Zaitchik BF, Gohlke JM. Heat waves and fatal traffic crashes in the continental United States. Accid Anal Prev. 2018;119:195-201.
18. Oviedo-Trespalacios O, Tichon J, Briant O. Is a flick-through enough? A content analysis of Advanced Driver Assistance Systems (ADAS) user manuals. PLoS One. 2021;16(6):e0252688.
19. Hooper J, Magor-Blatch L, Bhullar N. Life after bushfire: Post-traumatic stress, coping, post-traumatic growth. Australasian Journal of Paramedicine. 2018;15(3).
20. Gulian E, Matthews G, Glendon AI, Davies DR, Debney LM. Dimensions of driver stress. Ergonomics. 1989;32(6):585-602.
21. Paschalidis E, Choudhury CF, Hess S. Modelling the effects of stress on gap-acceptance decisions combining data from driving simulator and physiological sensors. Transportation Research Part F: Traffic Psychology and Behaviour. 2018;59:418-35.
22. Country Fire Authority. Staying safe in the car [updated 17 June 2021; cited 2022 28 March]. Available from: https://www.cfa.vic.gov.au/plan-prepare/staying-safe-in-the-car.
23. Taylor M, Wiebusch T, Beccari B, Haynes K, Ahmed MA, Tofa M. Driving into floodwater: using data from emergency responders to inform workplace safety policy and practice. Australian Journal of Emergency Management. 2020;35(4):26-34.
24. Titus J, editor Does sea level rise matter to transportation along the Atlantic Coast? The potential impacts of climate change on transportation: Summary and discussion papers Federal Research Partnership Workshop; 2002 1-2 October; Washington DC.
25. IPCC. Summary for Policymakers. In: Shukla PR, Skea J, Slade R, Al Khourdajie A, van Diemen R, McCollum D, et al., editors. Climate Change 2022: Migitation of Climate Change Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK and New York, NY, USA: Cambridge University Press; 2022.
26. Technical Committee 4.2 Road Bridges. Measures for increasing the adaptability of road bridges to climate change: A PIARC Literature Review 2022R24EN. https://www.piarc.org/ressources/publications/source/1/dd946f6-38696-2022R24EN-Measures-for-Increasing-the-Adaptability-of-Road-Bridges-to-Climate-Change-A-PIARC-Literature-review.pdf: PIARC; 2022.
27. Koetse MJ, Rietveld P. The impact of climate change and weather on transport: An overview of empirical findings. Transportation Research Part D: Transport and Environment. 2009;14(3):205-21.
28. Papadimitriou E, Filtness A, Theofilatos A, Ziakopoulos A, Quigley C, Yannis G. Review and ranking of crash risk factors related to the road infrastructure. Accid Anal Prev. 2019;125:85-97.
29. Metcalfe D, Coram J. CSIRO, editor. https://www.csiro.au/en/news/all/articles/2021/november/future-disaster-resilience: CSIRO. 2021. [cited 2026].
30. Chapman L. Transport and climate change: a review. Journal of Transport Geography. 2007;15(5):354-67.
31. Sakashita C, Job RFS. Addressing key global agendas of road safety and climate change: synergies and conflicts. Journal of Road Safety. 2016;27(3):62-8.
32. Pearce T, Rodríguez E, Fawcett D, Ford J. How Is Australia Adapting to Climate Change Based on a Systematic Review? Sustainability. 2018;10(9).
33. Zhu M, Sze NN, Newnam S. Effect of urban street trees on pedestrian safety: A micro-level pedestrian casualty model using multivariate Bayesian spatial approach. Accident Analysis & Prevention. 2022;176:106818.
34. Van Treese Ii J, Koeser AK, Fitzpatrick GE, Olexa MT, Allen EJ. Drivers' risk perception of roadside trees. Arboricultural Journal. 2018;40(3):153-61.
35. Giustozzi F, Jia Boom Y. Use of road-grade recycled plastics for sustainable asphalt pavements: Overview of the recycled plastic industry and recycled plastic types. AP-R648-21. https://austroads.com.au/publications/pavement/ap-r648-21: Austroads; 2021.