

Climate Change Office



State of Play Report: Tasmania's transport sector

October 2023

In recognition of the deep history and culture of these islands, we acknowledge all Tasmanian Aboriginal people as the continuing Custodians of this Land and Sea Country and pay our respect to elders past and present.

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Executive summary

Reducing our emissions

Tasmania recorded net zero greenhouse gas emissions for the first time in 2013, and we have maintained our net zero status in the years since. However, our emissions profile is not guaranteed into the future, and we know we must do more to maintain our net zero status by reducing emissions in all our sectors, while also increasing the carbon stored in our forests.

Tasmania's legislated economy-wide target of net zero emissions, or lower, from 2030, provides a flexible approach to emissions reduction and acknowledges that different sectors have different opportunities to reduce their emissions. For some sectors, more time, support and technology will be needed to transition to a low emissions future. To ensure a practical and balanced approach is taken to reducing emissions from our key sectors and building resilience to climate change, Tasmania's climate change legislation includes a requirement to develop sector-based Emissions Reduction and Resilience Plans (Plans).

The Plan for the transport sector is to be completed by November 2023, while all other Plans are to be completed by November 2024. The timeframe recognises both the significance of the transport sector to Tasmania's emissions profile and the commercial availability of technologies to reduce emissions from the sector.

Tasmania's transport sector

The transport sector currently accounts for approximately one-fifth of Tasmania's greenhouse gas emissions, excluding the land use, land use change and forestry (LULUCF) sector. There are many factors influencing emissions from the sector. In Tasmania, the fuel efficiency of our vehicle fleet and our dependence on cars are key considerations. It is important that we focus on increasing the use of public and active transport, while also increasing the uptake of low emissions vehicles in both our light and heavy vehicle fleets. It's important to recognise that many of the relevant regulatory mechanisms are the responsibility of the Australian Government. Partnerships and collaboration are also critical to the transition of the sector.

Tasmania's transport networks are essential for our economy, community, businesses and industry. They enable connectivity and accessibility to and from, and within the island, to meet the needs of residents, visitors, and business and industry. It is important that we ensure the sector is prepared for the physical impacts of climate change, such as an increased frequency of extreme weather events, which can disrupt the free movement of passengers and freight, and result in significant costs to businesses, households and governments. The sector will also require support in the transition to a low emissions future, for example to ensure that it has the skills and capability needed to support the uptake of low emissions vehicles. We also need to ensure our electricity grid is prepared for an increasing number of electric vehicles.

There are many initiatives underway at an international, national, state and local government level, and our businesses, industry and communities also play a critical role.








This State of Play Report has been prepared as the first step in the preparation of a Plan for the transport sector. It provides an overview of the transport sector in Tasmania to inform the identification of gaps and future opportunities for the draft Plan, which will be released for public consultation in the second half of 2023.

Background

Tasmania's *Climate Change (State Action) Act 2008* (the Act) sets out how the government must take action on climate change. Under the Act, Tasmania's emissions reduction target is to achieve net zero greenhouse gas emissions, or lower, in Tasmania from 30 June 2030. To help us achieve this goal, the Act requires the government to develop five-yearly sector-based Plans, in consultation with business and industry. The Plans will support a practical and balanced approach for our key sectors to reduce greenhouse gas emissions and build resilience to climate change.

The Plans must support greenhouse gas emissions reduction, the transition to a low emissions economy, and resilience to climate-related risks. The legislation also requires that the objects of the Act are taken into account during the development of the Plans.

Plans must be developed for the following sectors:

-  energy
-  transport
-  industrial processes and product use (IPPU)
-  agriculture
-  land use, land use change and forestry (LULUCF)
-  waste
-  any other sector or sub-sector determined by the Minister (the government has committed to develop a Plan for government operations).

Delivery and timeframes

Under the Act, the Plan for the transport sector must be prepared by November 2023, and all other Plans by 30 November 2024. The Minister for Environment and Climate Change is to consult with each relevant portfolio Minister, and with business and industry representatives, to develop the Plans. The Minister is also required to publicly consult on each draft Plan.

The Plans are to be tabled in Parliament and updated at least every five years. This work is being led by the Climate Change Office in Renewables, Climate and Future Industries Tasmania (ReCFIT).

Why sector-based emissions reduction and resilience planning?

The latest data show that Tasmania recorded net zero greenhouse gas emissions for the first time in 2013 and has maintained its net zero status in the nine reported years since. Our emissions profile is largely due to the carbon sink in our managed forest estate and our longstanding investment in renewable electricity generation.

However, our emissions profile is not guaranteed into the future. Emissions are influenced by a range of factors such as population growth, major bushfire events, changes in consumer demand, market forces and technological advancements. We know we must do more to maintain our net zero status by reducing emissions in all our sectors, while also increasing the carbon stored in our forests.¹

The *AR6 Synthesis Report: Climate Change 2023* by the Intergovernmental Panel on Climate Change (IPCC)² confirms that humans are causing global warming, and makes it clear that we need to act now. Global temperatures are now 1.1°C above pre-industrial levels and are likely to reach 1.5°C above pre-industrial levels in the early 2030s. In Tasmania, the impacts of climate change will have environmental, economic and social impacts on our businesses, industries, communities and our natural values. It is important that we adapt effectively to a changing climate and build strong, resilient communities, while continuing to reduce our emissions.

A consistent theme from consultation on the government's action on climate change is that a partnership approach between government and industry is the preferred approach to support emissions reduction and build resilience in Tasmanian businesses and industries.

Purpose of this State of Play Report

This State of Play Report (Report) has been developed to support the requirement to prepare a Plan for the transport sector and to guide consultation.

The Report provides a high-level summary of the transport sector in Tasmania, including its emissions and the impacts of climate change on the sector. The Report also outlines emissions reduction and resilience barriers and opportunities, and relevant policies and actions at the local, national and international level.

The Report will inform the identification of gaps and future opportunities for the draft Plan, which will be released for public consultation in the second half of 2023.

¹ Point Advisory and Indufor (2021) '2021 Update of Tasmania's Emissions Pathway Review – technical report' (prepared for the Tasmanian Climate Change Office)

https://recfit.tas.gov.au/data/assets/pdf_file/0009/348948/Tasmanian_Emissions_Pathway_Review_-_Technical_Report.pdf

² IPCC (2023) 'Climate Change 2023: Synthesis Report - Summary for Policymakers'

<https://www.ipcc.ch/report/ar6/syr/>

Framework for development of the Plans

Purpose	To develop pathways for key sectors to reduce greenhouse gas emissions that support Tasmania achieving its target of net zero emissions, or lower, from 2030, support the transition to a low emissions economy, and build resilience to the impacts of climate change.
Objectives	To identify priority actions for government, business and industry.
Principles	<ul style="list-style-type: none"> • Sustainable development and social equity • Transparency and reporting • Science-based approach • Integrated decision making • Risk management • Community engagement • Complementarity
Sectors	<ul style="list-style-type: none"> • Energy • Transport • IPPU • Agriculture • LULUCF • Waste • Any other sector or sub-sector determined by the Minister (the government has committed to develop a Plan for government operations)
Consultation	<ul style="list-style-type: none"> • Climate Change Reference Group • Portfolio Ministers • Targeted consultation with key industry stakeholders and government departments • Public consultation on each draft Plan
Timing	<ul style="list-style-type: none"> • Transport Plan to be developed by November 2023 • All other Plans are to be developed by November 2024 • The Plans will be progressively developed over the next 15 months, starting with transport, followed by waste, then energy and IPPU, and lastly agriculture and LULUCF
Key public outputs	<ul style="list-style-type: none"> • State of Play Report • Draft Plan • Final Plan
Next steps	<ul style="list-style-type: none"> • Implementation • Reporting through the annual climate change activity statement • Review of the Plans to identify gaps and opportunities for the development of Tasmania's next climate change action plan in 2025 • The Plans are to be updated at least every five years

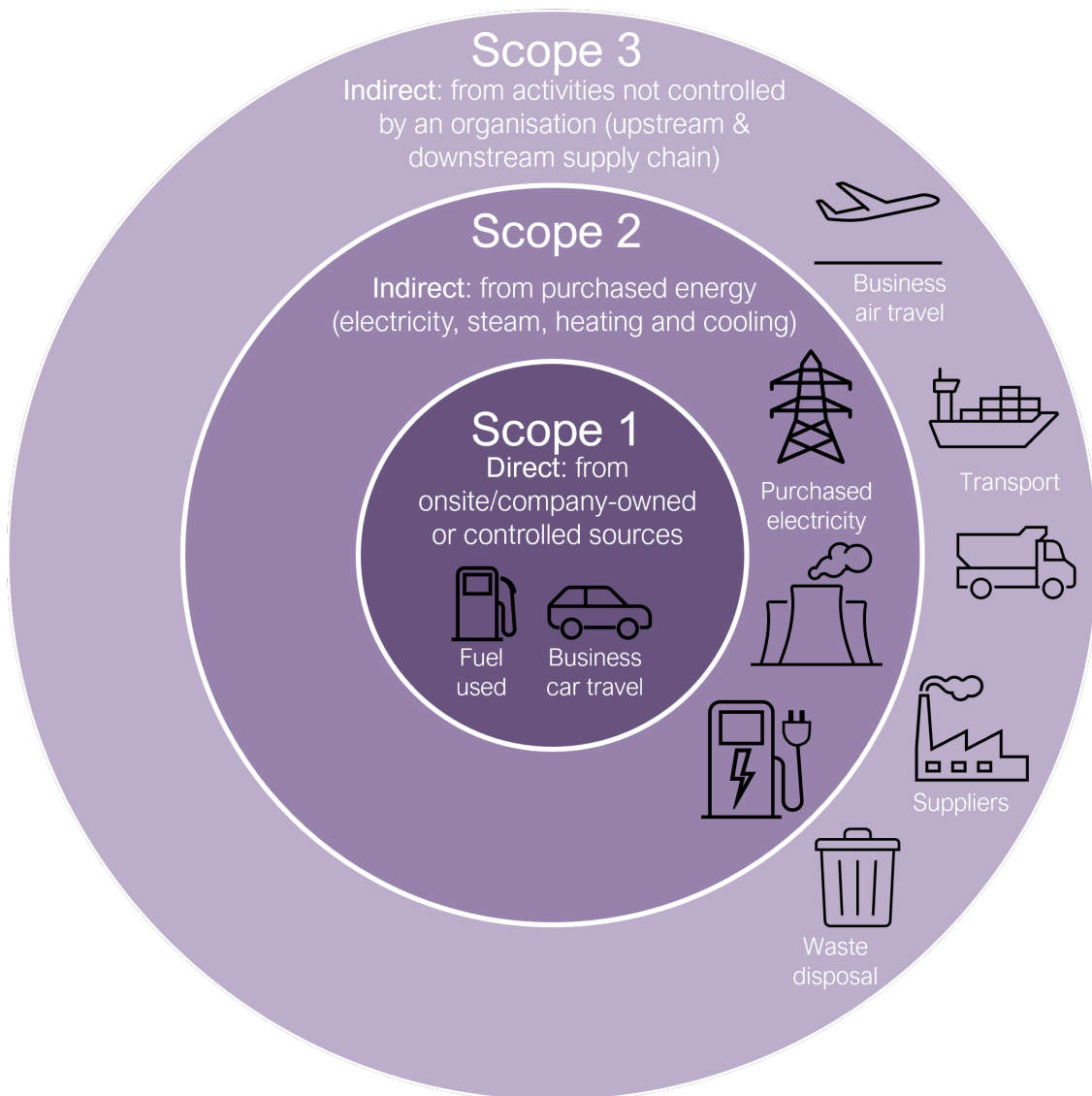
Scope of the Plan for the transport sector

The sectors identified for the development of Plans are based on the sectors in the United Nations Framework Convention on Climate Change (UNFCCC) greenhouse gas reporting framework.

Under the UNFCCC reporting framework, emissions from the transport sector include domestic aviation, road transportation (cars, buses, trucks, motorcycles), railways, domestic navigation (shipping, ferries, leisurecraft) and off-road vehicles. Road transportation accounts for over 90 per cent of Tasmania's transport emissions and is therefore the key focus for action. This does not include the embodied emissions from the production of transport infrastructure.

The Plan for the transport sector will focus on Scope 1 (direct) emissions and Scope 2 (indirect) emissions in the first instance, with opportunities to reduce indirect Scope 3 emissions considered where relevant.

Scope 1, 2 and 3 emissions



Emissions reduction and resilience measures that support transport to and from Tasmania are not within the scope of the Plan. These issues are largely the responsibility of the Australian Government. We recognise the significance of tourism to the Tasmanian economy and will build on existing work to support a sustainable tourism industry on-island, in line with the *2030 Visitor Economy Strategy*, released in August 2023, available at: www.tourismtasmania.com.au/industry/2030-visitor-economy-strategy/



Image: Chris Crerar

Due to the nature of the transport sector and the UNFCCC reporting framework, there is significant overlap between transport and other sectors. For example, emissions from the use of heavy vehicles in the agriculture and forestry sectors are accounted for in the transport sector and are therefore in the scope of the Plan for the sector.

Overlaps between sectors will be managed throughout the development of each Plan. The future opportunities identified in the Plans for each sector will be combined and inform the development of Tasmania's next climate change action plan in 2025, including the identification of priorities and gaps not addressed through the development of the sector-based Plans.

Tasmania's transport sector

Tasmania's transport system plays a vital role in connecting communities and facilitating economic growth. It provides access to services including health, employment and education and underpins our freight system. Our transport system spans road, rail, sea and air and is critical for economic activity ranging from agriculture to tourism. The transport, postal and warehousing sector employs approximately 15,000 Tasmanians.³

Tasmania is mountainous and has a lower population density than some other parts of Australia. These factors are challenging for our transport sector and have led to a heavy reliance on private vehicle transportation.

Roles and responsibilities

Governments, business, industry and the community all have roles in Tasmania's transport sector.

The Tasmanian Government is responsible for the operation and maintenance of the state-owned road network, which primarily consists of roads that provide connectivity between cities, major towns, rural catchments and key marine and air transport hubs.

The Department of State Growth also provides the legislation, regulatory policies, and practices to support an efficient, safe, and reliable land transport system. This role includes:

- managing Tasmania's state road network, which comprises over 3,700 kilometres of roads and over 1,300 bridges and major structures, facilitating the movement of people and freight
- delivering registration and licensing services to the Tasmanian community
- developing, encouraging and enforcing compliance with state-based regulations for roadworthiness, vehicle standards, dimensions and mass limits, loading and operation of vehicles
- delivering road safety, policies, programs, research and initiatives.

Government businesses also play an important role in Tasmania's transport sector:

- TasPorts is responsible for 11 Tasmanian ports and Devonport airport.
- TasRail is one of the largest transport service providers in Tasmania, connecting business and industry to major ports and freight terminals.
- Metro Tasmania is the largest Tasmanian-owned public transport company, operating bus services in Hobart, Launceston and Burnie.
- TasNetworks, as the manager of Tasmania's electricity transmission and distribution network, and Aurora Energy, as Tasmania's major electricity retailer, will play an increasingly important role as the uptake of electric vehicles (EVs) in Tasmania increases.

³ Australian Bureau of Statistics (2022) 'Modelling indicative state level industry jobs estimates from the Labour Account', <https://www.abs.gov.au/articles/modelling-indicative-state-level-industry-jobs-estimates-labour-account>

Tasmania's municipal councils are responsible for the management of local roads. The local road network makes up the vast majority of the state's overall road network. Councils have a role to play in planning and infrastructure to support active and public transport, road maintenance and management of parking and traffic movement, in addition to management of their own vehicle fleets, including waste collection trucks.

The Australian Government is responsible for rail, marine, heavy vehicles and aviation.

Business, industry and the community have a range of roles in the sector, including managing vehicle fleets, providing bus services, freight logistics, owning and maintaining vehicles for personal use, and using the state's bus services or active transport infrastructure.

Transport emissions

Transport sector emissions made up 48.2 per cent of energy emissions in 2021, and 21.0 per cent of total emissions at 1.74 megatonnes (Mt) of carbon dioxide equivalent (CO₂-e) (excluding the LULUCF sector).⁴

Transport emissions have increased by 9.0 per cent since 1990, driven by an increase in emissions from road transport, which likely reflects a growing economy and population. Emissions from road transport are responsible for over 90 per cent of transport sector emissions. Within road transport emissions, decreased emissions from cars have only partially offset increased emissions from light commercial vehicles, and heavy-duty trucks and buses.

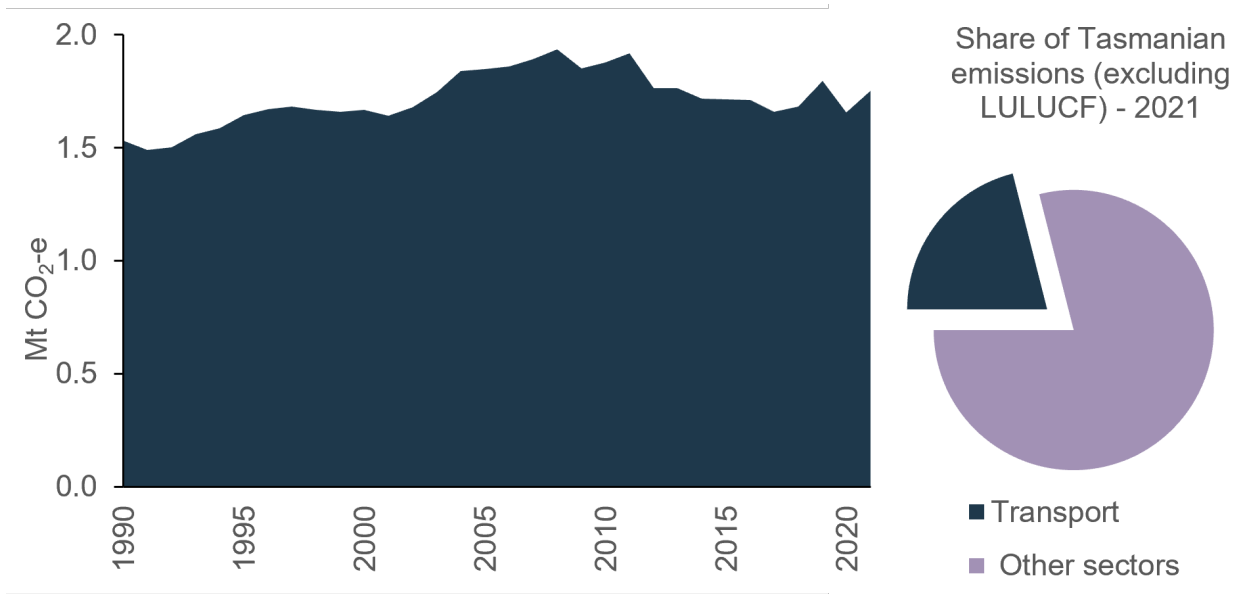
The fall in emissions from cars from 1990 reflects increasing fuel efficiency of vehicles. It may also reflect a substitution by some consumers to light commercial vehicles (such as vans and utes), the emissions from which have almost doubled since 1990.

More information about Tasmania's emissions is available in the greenhouse gas report, published annually by the Climate Change Office and available on the ReCFIT website:

www.recfit.tas.gov.au/tasmanias_greenhouse_gas_emissions

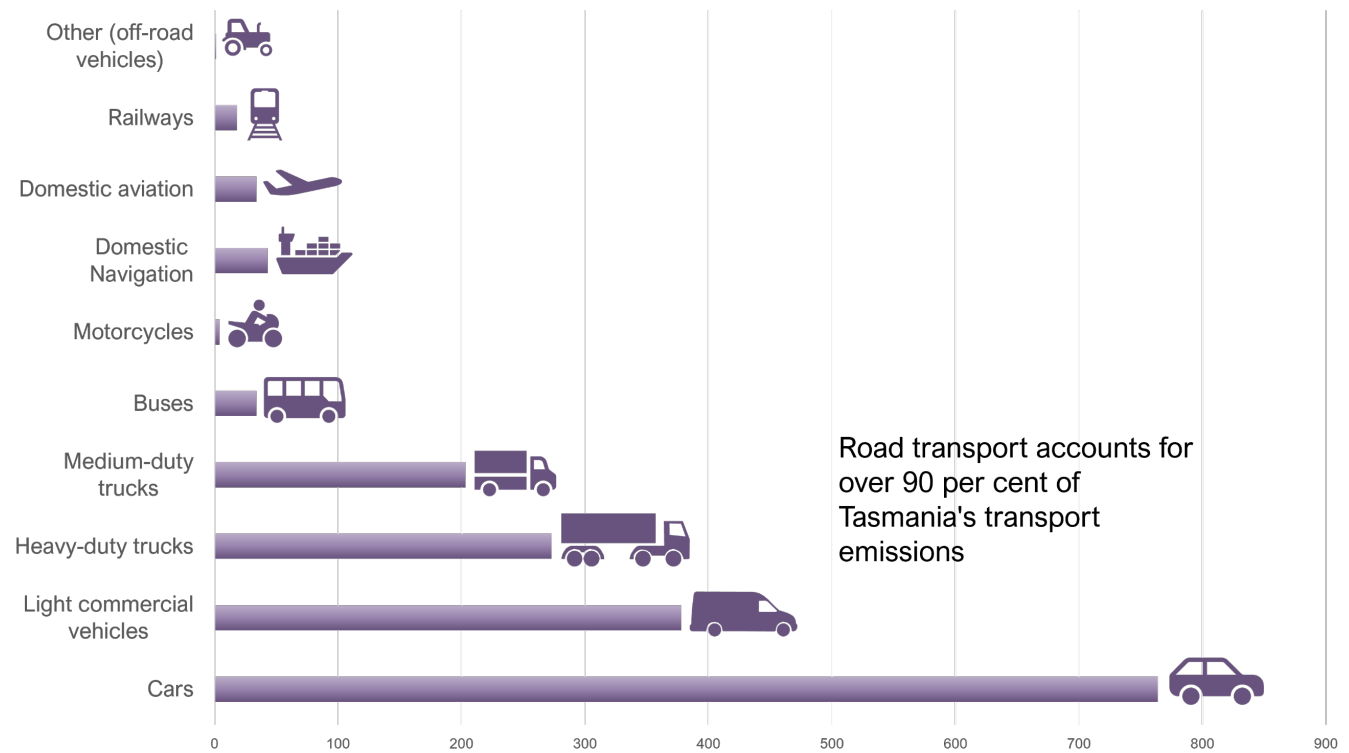
⁴ The main source of data on Tasmania's emissions is the Australian Government's State and Territory Greenhouse Gas Inventories, which are prepared each year as part of the reporting requirements under the UNFCCC.

Figure 1: Tasmania's emissions from transport - 1990 to 2021



Source: Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, State and Territory Greenhouse Gas Inventories 2021

Figure 2: Breakdown of Tasmania's transport emissions 2021 (Kilotonnes CO₂-e)



Source: Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, State and Territory Greenhouse Gas Inventories 2021

Factors influencing Tasmania's transport emissions

Emissions from the transport sector are dependent on a range of factors, particularly fuel efficiency, which is often linked to vehicle type and size, distances travelled, and the modes of transport used.

Passenger transport

Tasmanian vehicles have the oldest average age of any state or territory fleet, at 13.21 years, compared with the national average age of 11.25 years.⁵ Due to their older average ages, Tasmanian vehicles are more likely to be more polluting and have higher emissions than the national fleet. Tasmania also has a higher number of vehicles per person than the rest of Australia.⁶ As at 31 July 2023, Tasmania had 429,867 licensed drivers and 702,825 registered vehicles.

As well as having older vehicles and more of them, Tasmanians are more likely to rely on cars than other modes of transport, compared with other states and territories in Australia.⁷ In the 2021 Census, over 88 per cent of Tasmanians travelled to work by car as either the driver or passenger. Only 3.1 per cent of Tasmanians travelled to work by bus, while 5.4 per cent walked to work.

These statistics are influenced by a range of factors. For example, Tasmania's population is dispersed across larger cities, towns and small rural communities, creating challenges for our public transport networks. Tasmania is also a mountainous island, which can make active transport such as walking and cycling difficult.

Freight transport

The inherent physics of rail operations mean that freight moved by rail is less carbon intensive than freight moved by road on a like-for-like basis. Rail is best suited for point-to-point bulk freight movements, however these are limited in Tasmania. The majority of freight movements in Tasmania are over relatively short distances and are often time-critical, which gives road transport an advantage with its greater flexibility. In Tasmania, freight rail emissions are just under one quarter of road freight emissions on a per net tonne kilometre basis. It is estimated that over the next four years, using rail (rather than road) to move TasRail's existing freight will save Tasmania over 220,000 tonnes of CO₂, the equivalent of removing 24,700 cars from the road.

The Tasmanian Renewable Hydrogen Industry Activation Study includes options to consider the use of hydrogen for rail.

COVID-19

It is unclear how COVID-19 lockdowns contributed to changes in transport emissions over the period from the last quarter of 2019-20 and into 2021, as lockdowns impacted the movement of people around Tasmania and interstate. This restriction of movement is likely to have resulted in reduced emissions from cars, buses and aviation, but may have resulted in increased use of trucks and light commercial vehicles as businesses turned to home delivery options to support stay-at-home orders and movement restrictions.

⁵ Bureau of Infrastructure and Transport Research Economics (BITRE) (2023), 'Road Vehicles Australia', <https://www.bitre.gov.au/publications/2023/road-vehicles-australia-january-2023>

⁶ BITRE 2023.

⁷ Australian Bureau of Statistics (ABS) (2021) 'Australia's journey to work', 2021 Census, <https://www.abs.gov.au/articles/australias-journey-work>

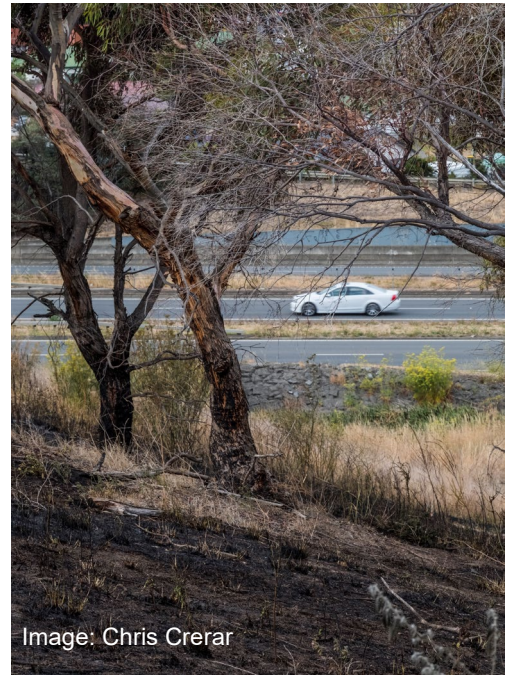
Impacts of climate change on the transport sector in Tasmania

Under a changing climate, we are expected to experience increased storm events and changes in rainfall patterns, which are likely to result in increased flooding, coastal inundation and erosion. We are also expected to experience increased temperatures, more hot days and heatwaves and longer fire seasons, with more frequent and intense bushfire events. We are expected to experience marine heatwaves, rising sea levels and increased windspeed. Extreme weather events are projected to increase in frequency and intensity over time. These events will have environmental, economic and social impacts on Tasmania's businesses, industries, communities and our natural values.

Physical risks

The projected changes to the Tasmanian climate will increase physical risks for transport systems. For example, extreme weather events such as floods are expected to increase in frequency and intensity and can cause damage to physical infrastructure. Damage to transport infrastructure disrupts the free movement of passengers and freight and results in costs to businesses and households. It also results in costs to government to repair or replace damaged infrastructure. The provision of emergency management services relies on the transport network remaining operational during extreme weather events.

The resilience of our transport systems to extreme weather events must be considered alongside other important considerations in the planning, construction and maintenance of transport infrastructure.



The impacts of floods on our transport networks

The October 2022 flooding around Tasmania has highlighted the need to consider the resilience of the state's transport system to withstand extreme weather events. Flooding resulted in significant damage to some roads, either by directly damaging roads or indirectly as a result of landslips/rock falls damaging roads. Some bridges were also damaged by floodwaters.

The Tasmanian Government manages emergencies such as this in accordance with the State Road and Bridge Emergency Management Plan, which describes the roles and responsibilities, governance and coordination arrangements across the four areas of prevention, preparedness, response and recovery.

Flooding also resulted in inundation of the rail network in the north and north-west. A section of the Western Line was significantly damaged, which impacted rail operations and industry while emergency repairs were made. Rail networks (including those in Tasmania) are susceptible to a single point of failure from an extreme weather event, because it is not possible to reroute trains onto alternative lines.

Debris and high-water levels in river systems resulted in port closures.

The Department of State Growth is also working to establish sustainability and resilience best practice principles in the planning and delivery of infrastructure, and identify opportunities to improve resilience as part of the upfront planning work when developing corridor strategies for state roads.

Transition risks

Transition risks are the risks and challenges associated with the transition to a low-emissions economy. They can arise from changes in policy, shifts in market preferences and technological advancements. They may include financial risks such as difficulties accessing finance or insurance, reputational damage and impacts on an organisation's social licence, legal risks such as liability related to climate change impacts, and challenges for workforce and labour markets.

For the transport sector, transition risks may include:

- funding for the state road network, which is currently funded through the Australian Government's fuel excise
- the management of different risks and hazards associated with EVs compared with internal combustion engine (ICE) vehicles, such as fire, radiation, heat, and chemical and electrical hazards
- the impact of low emissions vehicles, which are often heavier than ICE vehicles, on roads and bridges over time
- the need to ensure the transport sector has the skills and workforce capability to support the transition, for example the maintenance of EVs and charging infrastructure
- increased electricity demand to support EV charging
- in the longer-term, the introduction of autonomous vehicles.

It will also be necessary to consider resource recovery pathways for both obsolete ICE vehicles and new EVs and other low emissions vehicles. These challenges will be considered as part of the Plan for the waste sector.

TasNetworks EV Charging Trial

TasNetworks has conducted a 12-month EV trial with vehicle owners to understand the potential future charging impacts of EVs on the electricity network. As part of the trial, EV owners were eligible to receive a fast charger (valued at \$2,000) and other incentives.

In exchange, TasNetworks collected charging data and information about EV charging habits and potential impacts on the electricity network.

Opportunities, challenges and barriers

Emissions reduction opportunities

Tasmania's 100 per cent renewable electricity generation capacity means we are ideally placed to maximise the emissions reduction benefits of the transition to low emissions vehicles. Our EVs will be powered by zero emissions electricity rather than largely by fossil fuels like most other Australian states and territories.

Emissions reduction opportunities for the transport sector vary depending on the needs of different parts of our communities, business and industry. For example, while battery EVs are an important opportunity for light vehicles, they are not suitable for some long distance and commercial vehicle operations. In contrast, hydrogen fuel cell EVs (FCEVs) are lighter than BEVs and are quick to refuel, making them an important opportunity for heavy vehicle operators, including ferries, freight transport and planes.

While the electrification of Tasmania's vehicle fleet is an important opportunity, reducing our dependency on private vehicles and increasing the use of alternate low emissions fuels (where compatible for existing ICE vehicles) will also be critical to reduce emissions from the sector as fast as possible.

Low emissions vehicles in Australia

Battery EVs (BEVs) are powered by electricity and produce no tailpipe emissions.

Hydrogen fuel cell EVs (FCEVs) use a fuel cell powered by hydrogen instead of a battery. FCEVs are an emerging technology, with some vehicles in corporate and government fleets, and buses in some public and private transport fleets.

Hybrid EVs (HEVs) and plug-in hybrid EVs (PHEVs) combine a conventional ICE and an electric motor, and run on a combination of petrol or diesel and battery power. HEVs use a regenerative braking system to recharge the battery, while PHEVs can be recharged with electricity, by plugging into a power outlet. These vehicles produce tailpipe emissions. For the purposes of this Report, EVs are considered to be BEVs or FCEVs due to the greater emissions reduction potential, but it is acknowledged that HEVs and PHEVs can be transitional technologies.

Biofuels such as biodiesel and ethanol are produced from organic matter. In some instances, these fuels can be used in existing ICE vehicles with little modification required. Depending on the supply chain, biofuels can be blended with traditional fuels or used on their own as zero-emissions fuels.

The 2021 Tasmanian Emissions Pathway Review identified 16 “best-fit” emissions reduction opportunities for Tasmania. The opportunities were assessed based on their achievability against economic considerations, technical barriers and government policy. Three of the best-fit opportunities relate to the transport sector, as outlined below.

The Emissions Pathway Review estimated that these opportunities could reduce Tasmania's transport emissions by 1.29 Mt CO₂-e per year by 2050. For comparison, this represents 74 per cent of Tasmania's total transport emissions in 2021.

Emissions Pathway Review “best-fit” opportunities for Tasmania’s transport sector

Emissions reduction opportunities	Timeframe	Estimated annual abatement in 2050 (Mt CO ₂ -e)
Increase uptake of low emissions vehicles, including electric vehicles, in the passenger fleet.	Short-term	0.55
Increase uptake of public and active transport.	Short-term	0.05
Decarbonise the heavy transport fleet by using electric vehicles, hydrogen fuel cells, and renewable hydrocarbon fuels.	Medium-term	0.69
Total estimated annual abatement - 2050		1.29
Total transport emissions - 2021		1.75

Resilience opportunities

The Tasmanian Government has a number of initiatives underway to improve our understanding of the impacts of climate change on Tasmania. These initiatives include updating the fine-scale climate projections for Tasmania to provide updated information for a range of stakeholders, including those responsible for building and maintaining Tasmania’s infrastructure, and conducting Tasmania’s first statewide climate change risk assessment, due to be completed by November 2024.

These important projects will provide opportunities to support decision making, for example by integrating the findings into future planning and delivery of transport infrastructure. The options for increasing the resilience of our infrastructure to the impacts of climate change will vary depending on the risks in the region and may include installation of elevated roads and railways to improve flood resilience, or the use of heat resistant materials to prevent damage from extreme temperatures.

Co-benefits of reducing emissions and building resilience of the transport sector

In addition to reduced greenhouse gas emissions, reducing our reliance on cars and increasing the number of low emissions vehicles on Tasmanian roads provides other benefits to Tasmania, including:

- improved public health, for example reduced traffic noise and improved air quality
- increased energy security due to the reduced reliance on imported fuels
- reduced transport costs for households and businesses
- opportunities for the tourism sector, for example by incorporating EVs into strategies to make Tasmania a leading destination for climate-conscious travel
- generation of job opportunities, for example in sales, maintenance and deployment of charging infrastructure.

Challenges and barriers

- Tasmania has a lower population density compared with many parts of mainland Australia, resulting in challenges and significant costs associated with developing a well-integrated, connected transport network, particularly in regional areas.
- Tasmania is a mountainous island, making it difficult for many people to rely on active transport such as walking and cycling.
- Tasmania is seen as a touring destination for visitors, which promotes a high reliance on vehicles to explore the state. While many people and organisations are willing to consider purchasing low emissions vehicles, studies have shown that lack of consumer knowledge and awareness is a key barrier to the adoption of the technology. Concerns can include uncertainty about the total cost of ownership, the expectancy of battery life, and the constraints of limited driving range compared to ICE vehicles ('range anxiety').
- The current lack of choice of electric models for passenger, light commercial and heavy vehicles in Tasmania makes it difficult for consumers to find electric vehicles that meet their price and diverse transport needs.
- Globally, EVs are currently more expensive compared to their ICE vehicle equivalents, primarily due to the high cost of batteries. Despite falling costs of EVs and their lower operating costs, the upfront cost difference remains a major barrier to consumers.
- Despite some advantages hydrogen fuel cell vehicles have over EVs in certain uses, the refuelling costs, hydrogen supply and end use of infrastructure currently remains a major barrier for uptake in Tasmania.

Carbar Car Subscription Service

Aurora Energy has partnered with EV subscription service Carbar to offer Tasmanians a flexible alternative to EV ownership.

The subscription aims to cover all of the costs associated with owning, maintaining and running an EV, such as depreciation, interest, registration, insurance, routine servicing, roadside assist, mechanical faults, faulty and worn tyres, and batteries.

There is no lock-in contract for subscribers and they can choose from a range of available EVs.

What mechanisms are available to overcome the barriers and support the adoption of the opportunities for the sector?

The Tasmanian Government's own target is to transition its passenger vehicle fleet to 100 per cent electric by 2030. However, the role of business, industry and the community in reducing emissions in the transport sector is also critical. There are a number of policy options available to the Australian, Tasmanian and local governments, including:

- investing in technology and infrastructure (for example EV chargers and heavy vehicle refuelling stations)
- partnerships and collaboration (for example working with the Australian Government to implement national reforms)
- providing financial support, such as grants, subsidies and no-interest loan schemes
- policy and regulation (such as the introduction of a national fuel efficiency standard or standards for EV chargers in buildings)
- skills development and capacity building for automotive and electrical trades servicing EVs and electrical trades installing and maintaining EV chargers
- education and awareness (such as behavioural change campaigns to encourage Tasmanians to use public or active transport).



Key trends in the transport sector

International

Countries around the world are actively pursuing a range of strategies to decarbonise their vehicle fleets and transport networks.

Public and active transport

Many countries have highly developed public and active transport networks. For example, Tokyo's public transport system is known for its accuracy, punctuality, and extensive coverage. Denmark, Amsterdam, and the Netherlands more broadly, and Berlin, all have extensive networks of cycling infrastructure, pedestrian-friendly zones, various modes of public transport, and areas where car traffic is restricted.

In general, best practice public and active transport networks are well integrated, efficient, have good coverage, are reliable, affordable, and have multiple options (train, bus, tram), catering to the unique and diverse transport needs of the community.

Low emissions vehicles

The transition to low emissions and electric vehicles has varied across countries. In recent years, Australia has been one of the only advanced economies without a fuel efficiency standard. Fuel efficiency standards encourage the supply of EVs and other more fuel efficient vehicles into the country. The lack of a standard has been a major barrier to EV uptake in Tasmania. On average, new cars in Australia use 40 per cent more fuel than an equivalent vehicle in the European Union, 20 per cent more than the United States, and 15 per cent more than New Zealand.⁸

Many countries have set sales targets for EVs, emissions standards for ICE vehicles and in some instances have committed to phasing out the sale of new ICE vehicles completely.

China is the largest market for electric vehicles, with the government setting ambitious targets to support the uptake of EVs. Norway has the highest market share of EVs in the world and has decided on a national goal that all new cars sold by 2025 should be zero emissions (BEVs or hydrogen FCEVs). Norway has implemented a range of incentives to support EV uptake, such as exemption from import taxes and tolls, and reduced parking fees for EVs. In 2022, over 80 per cent of new car sales in Norway were EVs, with a global share of 10 per cent. For comparison, in the same year EVs represented 3.8 per cent of new car sales in Australia.

For existing ICE vehicles, many countries are mandating renewable liquid fuel blends or drop-in renewable fuels for light and heavy road vehicles, aviation and shipping engines. For example, Brazil has minimum fuel blending of ethanol with petrol of 25 per cent, and many vehicles use 100 per cent ethanol produced from sugarcane. These fuels can be distributed by existing fuel distribution systems and can be used in existing engines without the need for modifications. Biofuels provide an opportunity to decarbonise existing engines rapidly, and in the longer-term may decarbonise hard-to-abate transport sectors such as aviation, shipping and heavy transport.

⁸ Australian Government (2023) 'National Electric Vehicle Strategy'
<https://www.dcceew.gov.au/sites/default/files/documents/national-electric-vehicle-strategy.pdf>

International partnerships

Many countries, excluding Australia, have signed a COP26 ambition of 100 per cent share of zero emissions vehicles in new car and van sales by 2040 globally, and by 2035 in “leading” markets.

Tasmania participates in the Net Zero Futures Policy Forum, an international partnership of governments committed to addressing the practical challenges of achieving net zero emissions. Transport emissions have been an initial priority policy area since the Forum’s establishment in July 2022.

The Tasmanian Government has also established international partnerships related to green hydrogen, which is a key emissions reduction opportunity for heavy vehicles.

National

The decarbonisation of Australia’s transport sector is a priority for the Australian Government. Many of the regulatory mechanisms for the sector are the responsibility of the Australian Government. Recent and upcoming changes at a national level will have many benefits for the uptake of EVs in Tasmania.

In July 2023, the Australian Government announced its commitment to developing six sectoral decarbonisation plans, including one for the transport sector. Development will involve extensive consultation with the community, industry, experts and unions. The potential links and opportunities for the Tasmanian Government’s sector-based emissions reduction and resilience planning are currently uncertain. The Tasmanian Government will seek to maximise any opportunities for Tasmania as this work progresses.

The Australian Government has committed to developing a Maritime Emissions Reduction National Action Plan in 2023-24, with a scoping plan released in June 2023.

Other key Australian Government measures are outlined below.

Low emissions vehicles

Australia’s first National Electric Vehicle Strategy was released in 2023. It includes three key objectives: to increase the supply of affordable and accessible EVs, establish the resources, systems and infrastructure to enable rapid EV uptake, and encourage increased EV demand. Key new initiatives include:

- developing Australia’s first fuel efficiency standard for light vehicles
- preparing for a recycling, reuse and stewardship initiative for EV and other large batteries
- developing a national mapping tool to support optimal investment in, and deployment of, EV charging infrastructure.

National Fuel Efficiency Standard

In recent years, the primary barrier to EV uptake in Australia has been a lack of supply, where the demand for EVs has exceeded the amount that are available in the country. ⁹

As part of the National Electric Vehicle Strategy, the Australian Government has committed to introducing a national fuel efficiency standard to encourage car manufacturers to supply more EVs to Australia to make it easier and cheaper for Australians to access EVs.

The Australian Government is collaborating with the other jurisdictions to develop the standard, and public consultation was also undertaken in mid-2023.

Other Australian Government measures to support the uptake of low emissions light and heavy vehicles in Australia include:

- Establishing the Driving the Nation Fund to expand the national rollout of EV charging and hydrogen refuelling infrastructure, and support investment in fleets. Through the Hydrogen Highways program under the Fund, the Australian Government committed \$5.5 million to LINE Hydrogen for its green hydrogen production facilities near George Town in Tasmania.
- Setting a target of 75 per cent low emissions vehicles for Australian Government fleet new passenger vehicle purchases and leases by 2025.
- Supporting the transition of the transport sector through the Australian Made Battery Plan, National Reconstruction Fund, and Critical Minerals Strategy.
- Working with states and territories, through the Land Transport Infrastructure Governance Working Group, to reposition national infrastructure investment to support a sustainable infrastructure project pipeline and assist with the transition to a low emissions future.
- Undertaking a review into the resilience of Australian road and rail supply chains to inform action by government on how to effectively and efficiently mitigate risks in supply chains.
- Identifying the role of bioenergy in reducing transport sector emissions in Australia's Bioenergy Roadmap to help inform future policy and investment decisions.
- Considering the development of nationally consistent methodology and principles for road user charges for heavy vehicles.
- Working to further integrate the heavy vehicle freight sector into the Heavy Vehicle Management System to improve our understanding of the impacts of electric heavy freight vehicles coming into the marketplace on the existing road network.

⁹ Electric Vehicle Council (2023) 'State of Electric Vehicles: July 2023', https://electricvehiclecouncil.com.au/wp-content/uploads/2023/07/State-of-EVs_July-2023_.pdf

Interjurisdictional partnerships

The Tasmanian Government currently collaborates with the Australian Government and other states and territories through various forums such as the Energy and Climate Ministers' Decarbonisation Working Group, and the Infrastructure and Transport Ministers' Decarbonisation of Transport Working Group.

The National Electric Vehicle Strategy includes areas for collaboration with states and territories, including collaboration on national standards.

Tasmanian Government

The Tasmanian Government is committed to supporting the transition to EVs, reducing transport emissions more broadly, and ensuring our infrastructure is sustainable and resilient.

Public and active transport

The Tasmanian Government has many initiatives underway to support the uptake of public and active transport, including:

- developing a program to provide financial support for Tasmanians to purchase e-bikes and e-scooters, expected to launch in the second half of 2023
- delivering grant programs to support local councils to provide active transport infrastructure, such as cycleways and shared pathways, and to provide all-access, all-weather bus stops at priority locations
- the current Tasmanian planning instruments aim to improve access to public and active transport and reduce car dependency in Tasmania, including:
 - prioritising growth and promoting higher density living where there is access to public and active transport networks
 - identifying and planning for connectivity between settlements
 - providing for new and upgraded infrastructure on key corridors to allocate space for public and active transport. These objectives will be strengthened through development of the Tasmanian Planning Policies, the upcoming reviews of the Regional Land Use Strategies, and the review of the State Planning Provisions
- supporting Bicycle Network Tasmania to deliver the Back on your Bike program and Tasmania's Ride2School Day
- developing park and ride facilities across the south of the state
- updating the Tasmanian Walking and Cycling for Active Transport Strategy, which aims to create a safe, accessible and well-connected transport system that encourages more people to walk and cycle as part of their everyday journeys
- supporting the trial of ferries between Bellerive and Hobart and providing \$19 million over four years to deliver an ongoing service between Hobart and Bellerive, and provide appropriate infrastructure to support ferry operations, and exploring future options for low emissions ferries
- implementing a statewide fare structure for public transport and developing a contemporary integrated ticketing system, with real-time information, expected to be rolled out in 2024-25. As part of the statewide review of bus services, improvements have also been made to the network of bus

services and timetabling across each region of the state, and refinements continue to be implemented

- introducing a transit lane on the Southern Outlet to support a greater uptake of public transport and carpooling, and improved travel times and reliability for transit lane users
- supporting Metro Tasmania to deliver battery-electric bus trials in Launceston from late 2023, and hydrogen fuel cell electric bus trials in Hobart from mid-2024
- supporting an electric autonomous bus trial in Hobart, in partnership with the City of Hobart and the RACT, to provide valuable insights into how innovative and emerging technologies such as autonomous vehicles could be introduced to Tasmania in the future, especially focused on addressing one of today's transport challenges – reliable “last-mile” services.

Derwent Ferries

The Derwent Ferry service trial connecting Bellerive and Hobart, supported by the Tasmanian Government, commenced in August 2021.

The ferry service has now carried over 250,000 passengers in the two years since its commencement. It has become an important part of Tasmania's transport network, removing thousands of cars from the roads and the Tasman Bridge during peak hours.

The Tasmanian Government is developing a Derwent Ferry Masterplan that examines potential new stops and routes for the service, which will be progressed in partnership with the Greater Hobart Councils.

The Australian Government has also committed \$20 million for infrastructure, which will support expanding ferry services on the Derwent River.

Low emissions vehicles

Light vehicles

The Tasmanian Government is currently developing a program to support the uptake of EVs, as committed in *Tasmania's Climate Change Action Plan 2023-25*. The program is expected to be launched in the second half of 2023 and will include financial incentives and support for charging.

Through two rounds of the Electric Vehicle ChargeSmart Grants Program, the Tasmanian Government has supported the establishment of the first statewide EV charging network in Australia. Once installation of all ChargeSmart-supported chargers is complete, each fast charging station will have another station within 47 km, on average. More information about the program is available at:

www.recfit.tas.gov.au/chargesmart_grants

Other initiatives include:

- a target to transition the government vehicle fleet to 100 per cent electric by 2030 to reduce emissions and potentially result in an increased number of secondhand electric vehicles available for Tasmanians to purchase
- sponsorship of EV ‘try and drive’ days to allow members of the public to try an electric vehicle and address some of the common misconceptions around EVs and e-bikes.

- the draft Tasmanian Planning Policies will identify land and plan for infrastructure to support the use of EVs, including a public network of high quality EV charging stations, foreshadowing the increase in EV use in Tasmania.
- delivery of the Smarter Fleets Program from 2015 to provide tailored guidance and support to reduce greenhouse gas emissions and fuel costs for heavy vehicle, local government and state government fleets.

Heavy vehicles, rail and marine transport

The *Tasmanian Renewable Hydrogen Action Plan* (TRHAP) sets out a vision to develop a hydrogen industry in Tasmania. The vision is to become a leader in large-scale green hydrogen production, for export and domestic use, that will provide benefits to the long-term economic prosperity of Tasmania. The transport sector was identified as the most promising first area for the consumption of renewable hydrogen in the near-term, particularly in the heavy vehicle segment, which includes buses and trucks. The TRHAP is available on the ReCFIT website at: www.recfit.tas.gov.au/future_industries/green_hydrogen

The *Bioenergy Vision for Tasmania* identifies the potential for bioenergy to contribute to displacing the 1 billion litres of transport fossil fuels sold in Tasmania each year. The Bioenergy Vision is available at: www.recfit.tas.gov.au/future_industries/bioenergy

The Tasmanian Government has provided support for Abel Energy to develop Australia's first integrated green hydrogen and methanol production facility at Bell Bay. Every 200,000 tonnes of green methanol used as ship engine fuel would avoid up to 380,000 tonnes of CO₂ being emitted from fossil fuels. Abel Energy plans to source carbon from certified Tasmanian plantation forest residues, and dead and fire-damaged trees that do not meet minimum specifications for other uses.

To support TasRail's growth and high levels of service, the Australian and Tasmanian governments are co-investing in the Tasmanian Freight Rail Revitalisation program, with future funding committed to 2027-28. TasRail is investigating a range of technology pathways to transition to zero emission locomotive technology.

TasPorts completed an assessment of decarbonisation options for the business in 2022, which is now contributing to the development of a TasPorts decarbonisation target and strategy, looking at a range of options.

Resilience and transition to low emissions technologies

The Tasmanian Government has a number of initiatives underway to improve our understanding of the impacts of climate change on Tasmania. Initiatives include:

- updating the fine-scale climate projections for Tasmania to provide updated information for a range of stakeholders, including those responsible for building Tasmania's infrastructure
- development of Tasmania's first statewide climate change risk assessment, due to be completed by November 2024.

Tasmanian Government initiatives specifically to support the transport sector include:

- the draft Tasmanian Planning Policies, which promote planning decisions to be informed by the most up to date climate science to identify land subject to hazards and the provision of infrastructure to respond and adapt to a changing climate

- working to establish sustainability and resilience best practice principles in the planning and delivery of infrastructure, and identifying opportunities to improve resilience as part of the upfront planning work when developing corridor strategies for state roads
- managing emergencies impacting roads and bridges in accordance with the State Road and Bridge Emergency Management Plan, which describes the roles and responsibilities, governance and coordination arrangements across the four areas of prevention, preparedness, response and recovery
- expanding the Heavy Vehicle Access Management System (HVAMS) to include the heavy vehicle freight sector and help us understand the potential impacts of electric heavy freight vehicles coming into the marketplace on the existing road network
- participating in the Electric Vehicle Grid Integration Working Group, which is considering issues relating to the electricity grid, including bidirectional charging.

TasTAFE has developed short training courses for automotive technicians or apprentices to learn about the safety, knowledge and practical skills required to work on battery and hybrid EVs. TasTAFE has also signed a Memorandum of Understanding with Tasmanian Minerals, Manufacturing and Energy Council Limited (TMEC) to work together to develop a deeper understanding of current and future training demand in industry.

TasNetworks has taken part in a dynamic EV charging trial, funded by the Australian Government, to further understand the impact of EVs and the network's ability to shift energy during periods of high renewable energy supply and support the network in low periods.

Tasports completed a detailed climate change risk assessment of individual ports and assets in 2022, covering scenarios for 2030, 2050 and 2100. TasPorts is starting work on an adaptation and resilience plan to address risks identified in this process and will engage with external transport supply chain stakeholders.

Collaboration and partnerships

The government established the Electric Vehicle Working Group as an action under *Climate Action 21* in 2017. The Working Group brings together government agencies, government businesses, industry groups and community groups to develop a coordinated approach to supporting the uptake of electric vehicles.

The Department of State Growth's Transport and Infrastructure Group delivers a strategic, coordinated and statewide approach to the policy, planning and delivery of the state's transport services and infrastructure. Work has commenced to develop an Environmental Sustainability Strategy for the Transport and Infrastructure Group. The Strategy will guide the group to ensure that environmental sustainability is embedded into policies, operational activities, and the delivery of transport and infrastructure.

The Tasmanian Government is the only state or territory government that has partnered with the Blue Economy Cooperative Research Centre, collaborating on a number of projects, including the state's first renewable hydrogen electrolyser.

The Tasmanian Government has also formed key international partnerships to support its goals in the Tasmanian Renewable Hydrogen Action Plan, including exploring green hydrogen export opportunities, with the Rotterdam Port Authority in the Netherlands and the region of Flanders in Belgium.

Local government

Local governments and regional bodies across Tasmania play a critical role in planning and provision of transport services. The role varies depending on the size and location of the council and can include supporting active and public transport road maintenance, parking, and management of traffic and movement.

As the owners and maintainers of many of Tasmania's roads and paths, councils are key to supporting the uptake of public and active transport. The Tasmanian Government recognises the importance of local government's role and currently has two grant programs in place to support councils to upgrade bus shelters in priority locations, and to provide active transport infrastructure, such as cycleways and shared pathways, around the state.

Local governments can play an important role in the provision of public EV charging infrastructure. A number of councils have installed EV charging stations. The Electric Vehicle ChargeSmart Grants program has supported Burnie, City of Hobart, City of Launceston, Dorset, Huon Valley, Kentish and Southern Midlands councils to install EV chargers across the state.

Some Tasmanian councils have adopted electric vehicles into their own light vehicle fleets. Heavy vehicles are also an important focus for local government, given their ownership and management of waste collection trucks. Low emissions heavy vehicles are an emerging opportunity. In some mainland states, councils are trialling the use of electric waste collection trucks to determine their feasibility in different operating conditions while maintaining consistent and reliable services.

Business and industry

Globally, business and industry are actively working to decarbonise the transport sector. This includes actions within the sector itself, such as car manufacturers, as well as other organisations that manage vehicle fleets or have other opportunities to support the decarbonisation of the sector.

University of Tasmania Sustainable Transport Strategy

The University of Tasmania (UTAS) is Tasmania's second largest employer and has developed a Sustainable Transport Strategy to guide and support actions that deliver more sustainable transport outcomes and behaviours. The strategy is now in its third iteration, and over 10 years many positive changes have been achieved, including:

- installation of charging stations for bikes, motorcycles and cars
 - construction of bike hubs and end of trip facilities
 - implementation of an e-bike salary sacrifice option
 - implementation of the UniHopper bus service for students and staff between the Sandy Bay and Hobart campuses
 - incentives for public transport infrastructure, services and smartcard ticketing (Greencards)
 - the implementation of the first car share scheme in Tasmania
 - embedding sustainable transport principles in campus master planning and designs for precincts and buildings.
-

A number of major car makers have announced end dates for the manufacture of ICE vehicles, or targets for EV sales. For example, Honda aims to phase out ICE vehicles by 2040, Mazda has a goal for carbon neutrality by 2050 and expects EVs to be 25 per cent of its products by 2030, and Volvo has a goal to only be making electric cars by 2030.

In Tasmania, relevant projects include Abel Energy's development of Australia's first integrated green hydrogen and methanol production facility at Bell Bay, with support from the Tasmanian Government. In January 2023, Tasmanian shipbuilder Incat Tasmania announced it was in discussions to deliver the world's first large, lightweight, zero emissions ferry for South American customer Buquebus. Currently under construction, the 130-metre vessel was intended to be powered by liquefied natural gas (LNG), but Incat has recently been requested to investigate the possibility of replacing the LNG powerplant with a battery electric solution.

A number of other transport-related hydrogen projects are planned or underway, including for heavy vehicle and marine applications.

Elphinstone Battery Electric Vehicle Project

Tasmanian company Elphinstone has committed to developing a suite of BEVs for underground hard rock mining. The project is supported by the Australian Government's Modern Manufacturing Initiative, which allocated \$5.1 million to Elphinstone for BEVs. The project commenced in 2021 and is expected to create 15 highly skilled jobs, including a project manager, lead design engineer, software developer, mechatronics engineer and heavy machine fitters.

UNFCCC emissions reporting for the transport sector

The State and Territory Greenhouse Gas Inventory (STGGI), published by the Australian Government, provides estimates of emissions sources and sinks across five sectors. The five sectors included in the STGGI are:

- energy
- industrial processes and product use
- agriculture
- land use, land use change and forestry
- waste.

Due to the significance of the energy sector in Tasmania, this sector is split into three sub-sectors:

- electricity generation
- direct combustion (of fuels for stationary energy)
- transport.

Sources of transport emissions

Emissions from the transport sub-sector are produced by the combustion of fuels such as petrol, diesel and liquefied petroleum gas (LPG) in passenger and commercial motor vehicles, railways, domestic aviation, and shipping.

Emissions from the electricity used to power electric vehicles are accounted for in the electricity generation sub-sector.

Emissions from aircraft

Carbon dioxide (CO₂) emissions from domestic civil aviation are estimated using a combination of top-down activity data for aviation fuel sales at a jurisdictional level, reported in the Australian Petroleum Statistics, and bottom-up flight activity data and emission factors for various aircraft types, fuels and greenhouse gases.

Non-CO₂ emissions from large aircraft are estimated using data on the number of landing and take-off (LTO) cycles at Australian airports, the Australian aviation fleet and emission factors for LTO cycles, and cruising flights by type of aircraft. Small aircraft using aviation gasoline make up a small proportion of domestic civil aviation emissions and are estimated using default emission factors.

Emissions from international aviation are estimated in the National Greenhouse Accounts but are only reported as a memo item, by international agreement.

Emissions from shipping

Emissions from domestic marine navigation are estimated using a combination of fuel oil sales data reported in the Australian Petroleum Statistics, shipping activity data reported by Lloyds Register of Shipping, and internationally reported emission factors.

Emissions from bunker fuels

Emissions from international bunker fuels are estimated in the National Greenhouse Accounts but are excluded from inventory aggregates, by international agreement.

Tasmania's 1990 and 2021 emissions from transport – by source

Transport Emissions	1990 Mt CO ₂ -e	2021 Mt CO ₂ -e	% change
Transport	1.53	1.75	14.5
Domestic aviation	0.03	0.03	8.9
Road transportation	1.41	1.66	17.7
Cars	0.91	0.76	-15.8
Light commercial vehicles	0.19	0.38	97.7
Heavy-Duty trucks and buses	0.30	0.51	68.3
Buses	0.03	0.03	11.7
Heavy-duty trucks	0.16	0.27	67.7
Medium-duty trucks	0.11	0.20	85.0
Motorcycles	0.01	<0.01	-25.5
Railways	0.03	0.02	-41.0
Domestic Navigation	0.06	0.04	-28.8
Other (off-road vehicles)	<0.01	<0.01	-36.4

Source: Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, State and Territory Greenhouse Gas Inventories 2021

Glossary

Abbreviation or acronym	Description
ABS	Australian Bureau of Statistics
ACTIVE TRANSPORT	Alternatives to car travel that involve physical activity such as walking, cycling or scooting
BEV	Battery electric vehicle
BIOFUEL	Any fuel that is derived from biomass (plant or algae material or animal waste)
BIOENERGY	A form of renewable energy produced using biomass (plant or algae material or animal waste)
BITRE	Bureau of Infrastructure and Transport Research Economics
CO₂	Carbon dioxide; a greenhouse gas
CO₂-E	Carbon dioxide equivalent
COP26	2021 United Nations Climate Change Conference
DCCEEW	Australian Government Department of Climate Change, Energy, Environment and Water
DIRECT COMBUSTION	Burning of fuel(s) for energy, predominantly in manufacturing, mining, residential and commercial sectors
EMISSIONS	Greenhouse gas emissions
EV	Electric vehicle. For the purposes of this Report, unless otherwise stated, a reference to EVs includes battery electric vehicles (BEVs) and hydrogen fuel cell electric vehicles (FCEVs). It does not include hybrid or plug-in hybrid EVs.
FCEV	Fuel cell electric vehicle
ICE	Internal combustion engine (vehicle)
IPPU	Industrial Processes and Product Use
LOW EMISSIONS VEHICLE	For the purposes of this Report, low emissions vehicles include battery electric vehicles (BEVs) and hydrogen fuel cell electric vehicles (FCEVs). A reference to low emissions vehicles does not include hybrid or plug in hybrid EVs.

Abbreviation or acronym	Description
LPG	Liquid petroleum gas
LULUCF	Land Use, Land Use Change and Forestry
MT	Megatonnes
NEM	National Electricity Market
RECFIT	Renewables, Climate and Future Industries Tasmania
STGGI	State and Territory Greenhouse Gas Inventories
TPP	Tasmanian Planning Policies
UNFCCC	United Nations Framework Convention on Climate Change



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