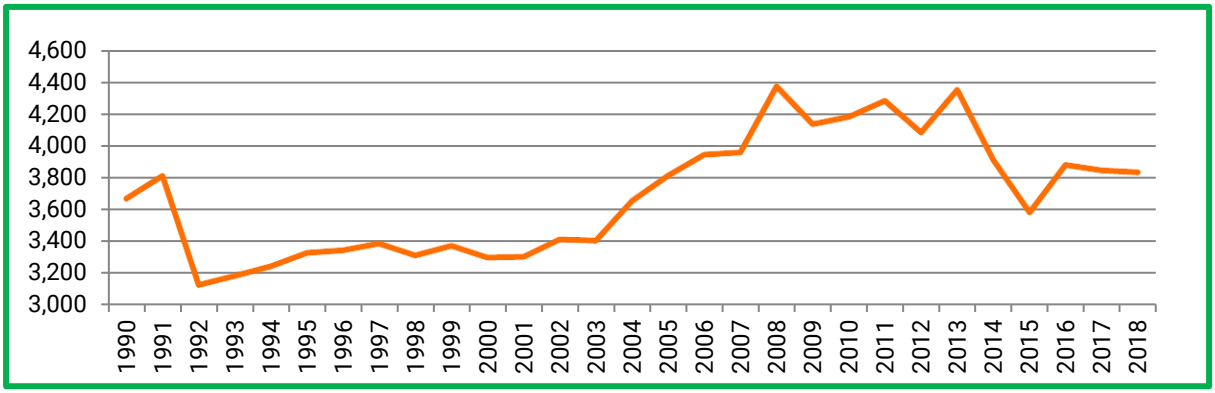
Transport and Energy

Background

Aside from LULUCF, energy emissions account for nearly half of Tasmanian GHG emissions. Within energy emissions, direct combustion is responsible for 47%, transport for 41%, and electricity generation for 11%.[1] Energy emissions have been trending slightly upwards, and in 2018 were higher than in 1990 (Figure 1.1.5).

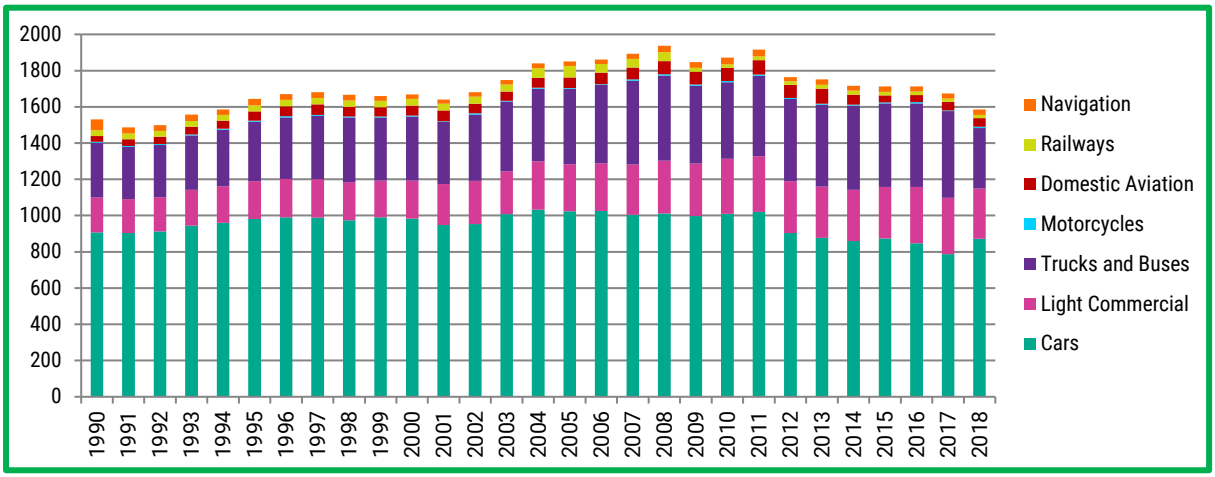
Figure 1.3.1: Energy Emissions[2]



Transport

Figure 1.3.2 shows the breakdown of emissions by vehicle type in Tasmania. Emissions have decreased in recent years, but are still higher than in 1990. In 2018, transport emissions made up 19% of total emissions (excluding LULUCF).

Figure 1.3.2: Emissions (kt C02-e) per vehicle type[3]



[1] Tasmanian Climate Change Office, State Greenhouse Gas Inventory 2016-17, 2019, p. 17.
[2] Data Source: http://ageis.climatechange.gov.au/NGGITrend.aspx
[3] Data Source: http://ageis.climatechange.gov.au/NGGITrend.aspx

Electric vehicle uptake provides the least disruptive pathway for reducing vehicle emissions, and it needs to be rapidly incentivised. To improve electric vehicles uptake there needs to be sufficient charging infrastructure. Consumer attitude surveys have consistently shown wide support for policies that support the provision of public charging infrastructure, and the installation of home chargers.[4]

Electric vehicle charging infrastructure

Government buildings will be fitted with charging infrastructure. Grants will be provided to businesses and councils for public charging infrastructure, and to households for home charging infrastructure.

In 2017, cars made up 54% of transport emissions in Tasmania, and accounted for 19% of energy emissions and 9% of total emissions. These numbers increased slightly in 2018 as a result of a marked decline in commercial vehicle emissions that year.

India, the Netherlands and Norway all have strategies to ensure new car sales are electric vehicles by 2030, 2030 and 2025 respectively.[5] 2016 research by Bloomberg New Energy Finance suggested electric vehicles will become a more economic option during this decade.[6] This timeframe has also been posited in a number of other studies.[7,8]

Consumer incentives for electric cars

All new car sales after 2030 must be electric cars – except for prescribed circumstances. In the interim, we will legislate for a registration fee exemption for all electric vehicles sold before 2030. This cost will be offset by incremental increases to registration fees for higher emitting vehicles.

In 2017, 1.19 million new cars were sold in Australia[9], compared to 39.3 million used car sales.[10] In other words, 97% of car sales were for used cars. Given the average age of the Tasmanian car fleet, this percentage may be even higher in Tasmania.

On average, the Tasmanian car fleet is 12.9 years old – and has been ageing every year for some time.[11] On 30 June 2016, there were 457,922 motor vehicles in Tasmania.[12] This grew to 474,951 by 30 June 2018.[13] This was a growth of 17,029 vehicles, or 8,514 vehicles per year.

Sales data does not extend past 2017. However, if the monthly average for the months of July 2016 – December 2017 of 1,714 were adopted for the six missing months then the total sales during this period were 41,153, an average of 20,576 per year.[14]

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[4] Electric Vehicle Council, State of Electric Vehicles, 2019, p. 26.
[5] The Australia Institute, If you build it, they will charge, 2017.
[6] Bloomberg New Energy Finance, Electric vehicles to be 35% of global new car sales by 2040, 2016.
[7] Lutsey, Nic, and Nicholas, Michael, Update on electric vehicle costs in the United States through 2030, International Council on Clean Transportation, 2019.
[8] UBS, UBS Evidence Lab Electric Car Teardown – Disruption Ahead?, 2017.
[9] Budget Direct, Australian car sales statistics 2020, 2020.
[10] Cox Automotive, Used Car Market Report and Outlook, 2018, p. 17.
[11] Ibid.
[12] Australian Bureau of Statistics, Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2016, ABS Cat. 9208.0.
[13] Australian Bureau of Statistics, Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2018, ABS Cat. 9208.0.
[14] Australian Bureau of Statistics, Sales of New Motor Vehicles, Australia, December 2017, ABS Cat. 9314.0.

Assuming fleet growth and vehicle sales volumes remain steady, even if 100% of *new* car sales from 2022 were electric, the penetration into Tasmania's vehicle fleet would likely be approximately 30% by 2030. If 30% of new vehicle sales every year were electric cars from 2022 onwards, this would provide 10% penetration of the entire vehicle fleet. If only 15% of new vehicle sales are electric, it would only result in a 5% penetration of the total car fleet.

Creating a second-hand market prior to 2030 will be critical for reducing transport emissions in the near to medium future. The Tasmanian Government currently has a target of 100% electric vehicle government fleet – however, there are no binding requirements and immediate purchases are set to be lower.[15]

Creating a supply of second-hand EVs

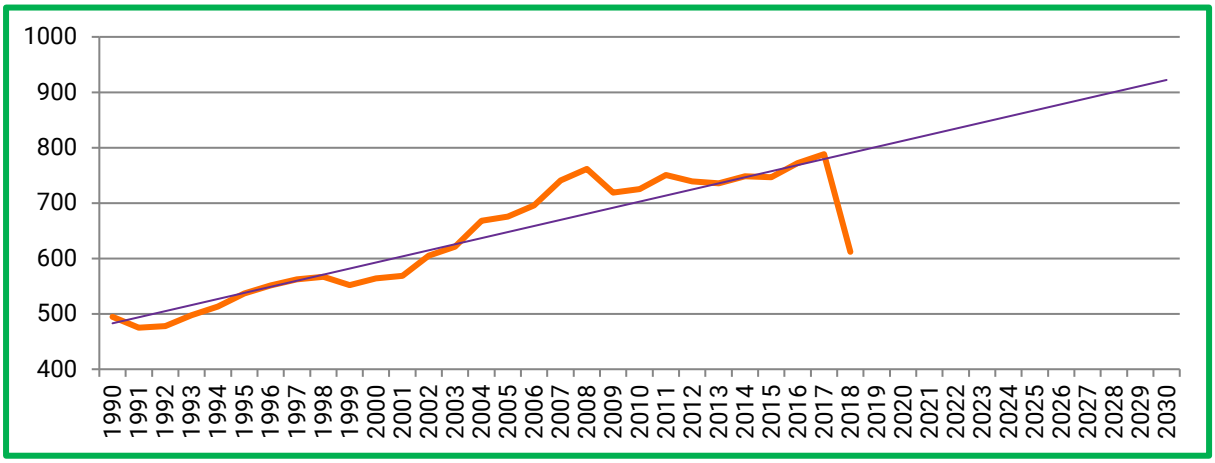
A Treasurer's Instruction requiring all new government car purchases to be electric - except for prescribed circumstances - will be issued, in order to increase the supply of a second-hand fleet as quickly as feasible.

Motorcycles (0.3%), railways (1%), and domestic navigation (1.7%) only make up a small proportion of Tasmania's transport emissions. Buses are not reported separately in Tasmania, but only make up 2% of Australian energy usage, therefore they are likely to be minor contributors.[16]

Domestic aviation made up 0.3% of transport energy use in 2018, but in 2010 made up 10%, indicating volatility in the year-on-year statistics. While aviation can be higher than other contributors, given the lack of alternatives available, it is not a priority action area.

The next largest contributor after cars is trucks. In 2017, light, medium and heavy trucks combined represent 47% of Tasmania's transport emissions. In 2018, this fell to 39%, which was a significant anomaly to previous years and the figure should be interpreted with care. With the exception of 2018, the upwards trend in the total emissions and emissions share of light and heavy commercial vehicles is significant.

Figure 1.3.3: Tasmania truck emissions (kt C02-e) trend[17]



[15] Tasmanian Government, Ambitious 100% Electric Vehicle Target, Nov 2020.
[16] Department of the Environment and Energy, Activity Table 1990-2017 - Energy - Transport, 2019.
[17] Data Source: http://ageis.climatechange.gov.au/NGGITrend.aspx

The Australian Government projects a significant increase in truck GHG emissions nation-wide by 2030[18]. Growth in Tasmania also looks likely if current trends continue (Figure 1.3.3). Enacting policies to lower emissions from trucks is critical.

Consumer incentives for electric trucks

We will set a reduced registration cost for the lifecycle of electric trucks. This cost will be offset by incremental registration fee increases for higher emitting trucks. We will also provide one off grants for companies to trial electric truck technology previous untested in Tasmania, with participation in studies to be a grant condition.

In March 2019, 4 of the total 1595 vehicle sales (0.2%) were electric vehicles.[19] This is an improvement on the 56 sales between 2011 and 2016[20] (approximately 0.05% of sales)[21], but still represents a tiny proportion. Obtaining further information will be important for informing policy on electric vehicles.

Electric vehicle consumer and supplier study

We will initiate a study into consumer and supplier electric vehicle uptake barriers in order to inform future policies.

Electricity Generation

GHG emissions from electricity generation in Tasmania make up a relatively small proportion of our overall emissions - approximately 5% (excluding LULUCF). These are primarily from the Tamar Valley Power Station.[22]

100% renewable

By 2030, we will decommission the Tamar Valley Power Station and ban generation of non-renewable energy in Tasmania's electricity grid.

Eliminating non-renewable generation in Tasmania requires that we maintain robust renewable generation capacity. In 2011, four major industrial companies (Norske Skog, Nyrstar, Rio Tinto Alcan and BHP Temco) consumed approximately 50% (5,800 GWh per annum) of Tasmania's electricity.[23] Recent reporting suggests this is still the case.[24] All four major industrials have had closure scares over the past decade.[25,26,27,28]

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[18] Department of the Environment and Energy, Australia's emissions projections 2016, p. 14.
[19] Ford, Tasmanian new vehicle sales racing ahead of 2018 levels, The Advocate, 4 April, 2019.
[20] Tasmanian Climate Change Office, Electric Vehicles in Tasmania: Current State of Play, 2018, p. 6.
[21] Australian Bureau of Statistics, Sales of New Motor Vehicles, Australia, December 2017, ABS Cat. 9314.0.
[22] Tasmanian Climate Change Office, State Greenhouse Gas Inventory 2016-17, 2019, p. 23.
[23] Electricity Supply Industry Expert Panel, Tasmania's Energy Sector – an Overview, p. 22.
[24] Denholm, M, Big business fears state power costs hike, The Australian, September, 2019.
[25] Ibid.
[26] Heyward, P, Boyer mill Norske Skog keeps turning fresh pages in constant reinvention to stay ahead, The Mercury, 2013.
[27] Smiley, S, Bell Bay Aluminium deal to secure 1,500 jobs, Tasmanian Government says, ABC News, May 2015.
[28] Humphries, A, Nyrstar's falling share price, job cuts have unions worried about Hobart plant's workforce, ABC News, October 2018.

A 2016 forecast study found that the closure of Temco would result in a reduction in electricity demand (by about 800 GWh). [29] Under a low growth scenario, this would see demand reduce to 9,500 GWh by 2030. However, projections would suggest that under a base scenario the slump in demand from the closure of one major industrial would eventually be offset by demand growth. [30]

Predicting demand is clearly difficult in the Tasmanian context, as the collapse of one or more major industrial could impact on demand from between 10%-50%. Demand growth, however, is certainly a possible scenario.

Renewable energy generation location mapping

We will begin a mapping project of environmentally, socially and generation capacity appropriate sites for industrial solar, wind, tidal and wave energy generation. The mapping of these sites will allow for less controversial developments and improve approval timeframes.

The proliferation of electric vehicles will lead to increased demand on Tasmania's electricity generation. As of July 2019, there were 332,793 cars registered in the State.[31] Cars in Tasmania travel an average of 12,000 km per year.[32] Four of the most popular electric cars have an energy consumption rate of 30 kWh / mile (18.6 kWh / km) or less.[33]

An assumed higher average consumption of 20 kWh / km equates to an energy use of 2,400 kWh per year per car, or a total of 798 GWh per year for the whole of Tasmania's car fleet.

Figure 1.3.4 demonstrates an estimated energy cost of 1,584 GWh for total conversion of Tasmania's truck fleet. There are scarce resources indicating kWh/km consumption by electric trucks, so these numbers could vary significantly.

Figure 1.3.4: Electric truck energy requirements estimates

Vehicle Type	Number[34]	Average km/year[35]	total km/year	kWh/km	Total GWh
Light commercial	104,396	12300	1,284,070,800	0.7[36]	898.85
Rigid trucks	12,761	17700	225,869,700	1.83[37]	413.34
Articulated trucks	1,846	76200	140,665,200	1.83	257.42
Non-freight	926	8700	8,056,200	1.83	14.74
Total	-	-	-	-	1,584.4

[29] TasNetworks, Electricity Sales and Maximum Demand Forecasts for Tasmania to 2045, 2016, p. 56.
[30] Ibid, p. 55.
[31] Australian Bureau of Statistics, Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2018, ABS Cat. 9208.0.
[32] ibid.
[33] U.S. Office of Transportation and Air Quality, compare side-by-side, accessed: 29 August, 2019.
[34] Australian Bureau of Statistics, Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2018, ABS Cat. 9208.0.
[35] Ibid.
[36] Łebkowski, A, Electric Vehicles Trucks - Overview Of Technology And Research Selected Vehicle, Scientific Journal of Gdynia Maritime University, Nr 98/2017, p. 165.
[37] Mareev, I and Sauer, DU, Energy Consumption and Life Cycle Costs of Overhead Catenary Heavy-Duty Trucks for Long-Haul Transportation, *Energies,* Vol. 11, no. 3446, 2018.

There are 29,273 photovoltaic systems connected to Tasmania's grid with a total generation capacity of 112.6 MW[38] for an average of 3.8 kW per system. In Tasmania, 3.8 kW solar system outputs range from between approximately 4,000 and 5,000 kWh per year.[39]

Assuming a State average of 4,500 kWh per year, 177,333 additional photovoltaic systems would be required to power a total conversion of the current car fleet, and 352,000 systems to power a total conversion of the truck fleet. These numbers would be reduced to approximately 110,000 and 220,000 respectively for 6 kW systems.

There are 9,901,496 private dwellings in Australia[40] and a total of 15,243,669 buildings.[41] The total number of buildings is 154% of private dwellings. In Tasmania there are 241,744 private dwellings.[42] Using the national ratio, this would indicate there are a total of 372,172 buildings in Tasmania. Taking into account the current number of buildings with PV connections, Tasmania would need an average of 6 kW photovoltaic systems on approximately 95% of our buildings to fully provide the energy for electric vehicles through rooftop solar.

A more modest 238 GWh per year would be required for a 10% conversion of both the current car and truck fleets. This would equate to approximately 52,900 systems at the current 3.8 kW average, or approximately 33,700 6kW systems.

Between 2016 and 2018, the average number of new solar connections per year was 2,071.[43] This suggests that by 2030, there would be 16,568 new connections established under business as usual. The average kW output per system has also been trending upwards, on average 0.2 kW per year between 2013 and 2018.[44] This indicates the kW output of systems being installed is already naturally trending upwards. Based on the trend at 2018, Tasmania would reach an average system being 6kW by 2030.

Rooftop Solar
We will increase the current annual rate of new PV system connections to 4,212 per year by mandating new 6kW systems for new public housing properties, progressively retrofitting existing public housing stock with 6kW systems, and providing subsidies to low income households and rental properties for PV system installations.

Manufacturing Industries and Construction

Emissions from manufacturing industries and construction have increased by 18% from 1,002 kt CO_2-e in 1990 to 1,182 kt in 2018. [45] Direct combustion accounts for 14% of Tasmania's

[38] Office of the Tasmanian Economic Regulator, Energy in Tasmania Report 2017-18, 2018, p. 26.
[39] Life's Good, Solar System Output Calculator, accessed: 30 August, 2019.
[40] Australian Bureau of Statistics, 2016 Census QuickStats – Australia, accessed: 29 August, 2019.
[41] Geoscape, How many buildings in Australia? Geoscape achieves national coverage, 2018.
[42] Australian Bureau of Statistics, 2016 Census QuickStats – Tasmania, accessed: 29 August, 2019.
[43] Office of the Tasmanian Economic Regulator, Energy in Tasmania Report 2017-18, 2018, p. 18.
[44] Ibid.
[45] Tasmanian Climate Change Office, State Greenhouse Gas Inventory 2016-17, 2019, p. 11.

total emissions (excluding LULUCF).[46] Direct combustion is the combustion of fuels for direct localised use, and does not include generation of electricity supply or transport combustion.

In 2017, *Pulp, Paper and Print* made up 16% of Manufacturing industries and construction emissions, with Food Processing, Beverages and Tobacco accounting for another 8%.[47] The source of the remainder of emissions from manufacturing industries and construction in Tasmania is confidential. Other sectors include Iron and Steel, Non-Ferrous Metals, Chemicals, Non-Metallic Minerals and other.

Non-Ferrous metals are the largest contributor at the Australian level[48] and make up over 40% of Tasmania's exports.[49] This suggests non-ferrous metals likely make up a significant proportion of manufacturing industries and construction emissions.

Industrial Machinery Standards

We will introduce progressive standards for the procurement of new industrial machinery and best available techniques in key industries in order to minimise emissions from direct combustion and support industry transition.

[46] Ibid, p. 18.
[47] Data Source: http://ageis.climatechange.gov.au/NGGITrend.aspx
[48] Ibid.
[49] Brand Tasmania, Minerals and Mining, accessed on: 3 September, 2019.