NSW GOVERNMENT

CLEANAIR FOR NSW

VEHICLE EMISSIONS

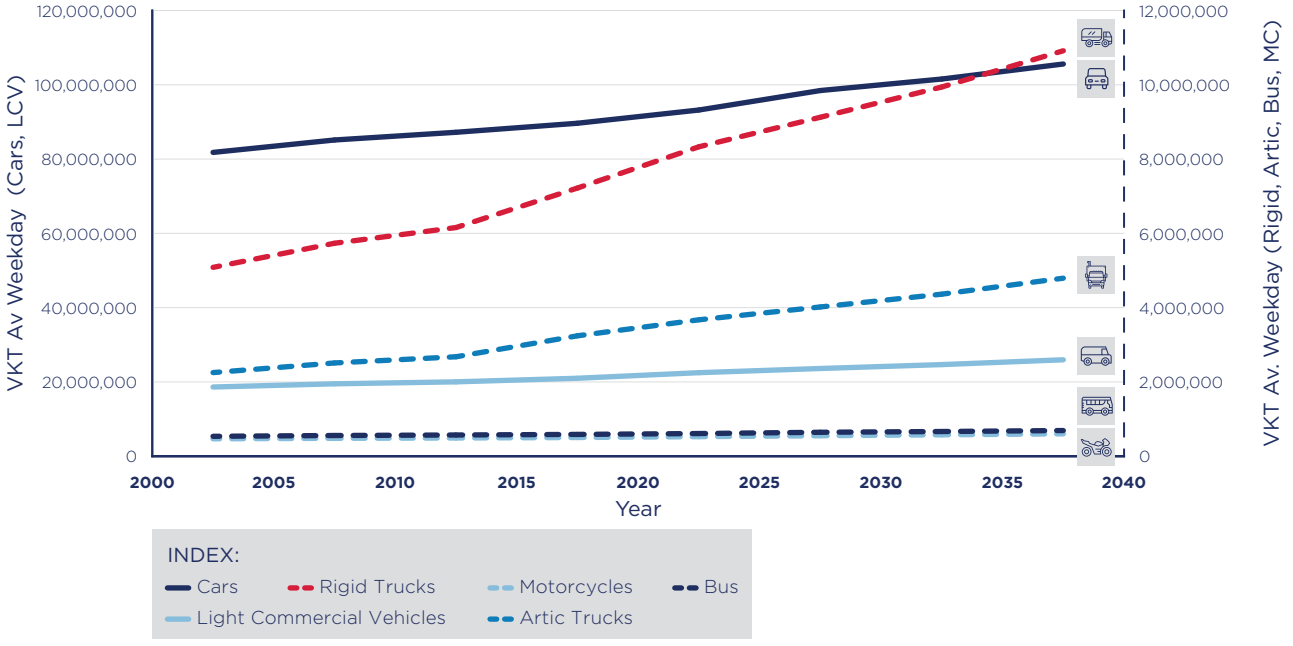
Motor vehicles are a significant contributor to air emissions in the NSW Greater Metropolitan Region (GMR) and regional centres.

Passenger cars make up the largest proportion of vehicle movements, and with metropolitan and regional growth, there is an increase in motor vehicle use for personal transport. Heavy and light commercial vehicle movements are also growing to move freight, consumer goods, construction materials and waste.

Vehicle kilometres travelled (VKT) are increasing steadily, with passenger transport increasing annually in line with population growth at around 1.5%, and freight travel is increasing roughly in line with Gross State Product growth at 2–3% per annum.

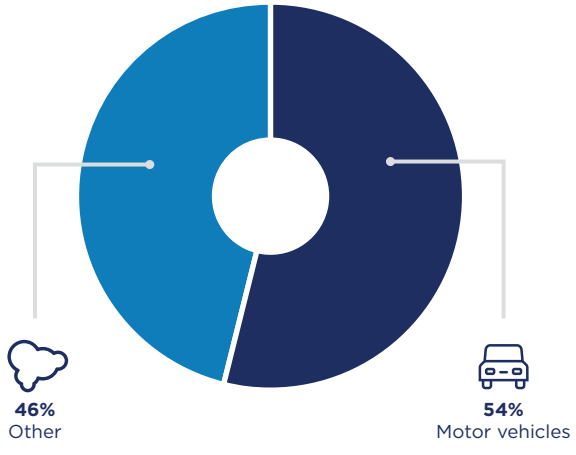
Motor vehicles are significant human-made sources of nitrogen oxides (NO_x) and volatile organic compounds (VOCs). As well as localised impacts, NO_x and VOCs contribute to regional air quality impacts and the formation of secondary $PM_{2.5}$ and photochemical smog. While motor vehicles are contributors to particle pollution (both $PM_{2.5}$ and PM_{10}), there are many other human made sources of particles (eg wood burning, quarrying and mining).

AVERAGE WEEKDAY VKT GROWTH 2003–2036, BY VEHICLE TYPE[1]

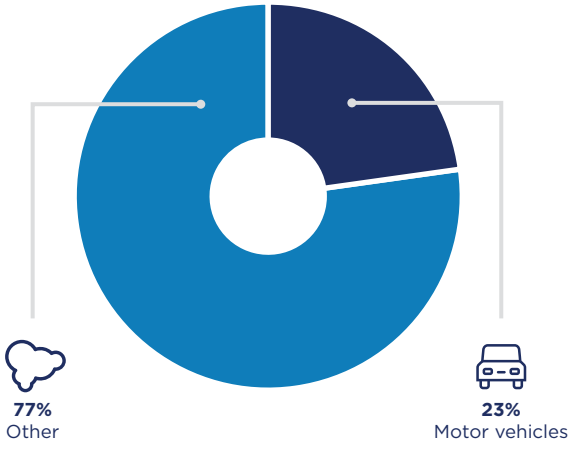


ANNUAL AVERAGE CONTRIBUTIONS TO EMISSIONS, 2008, IN SYDNEY, WOLLONGONG AND NEWCASTLE[2]

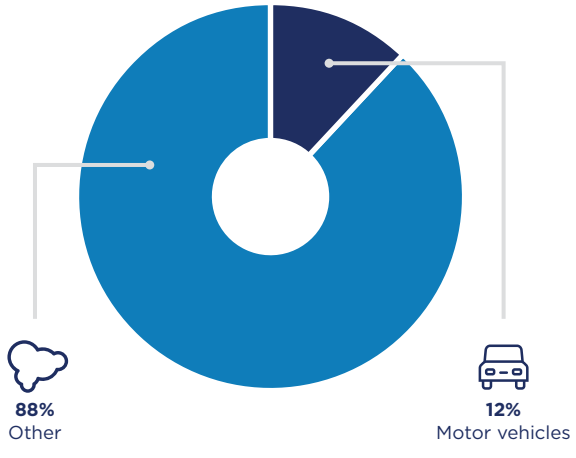
NO_x



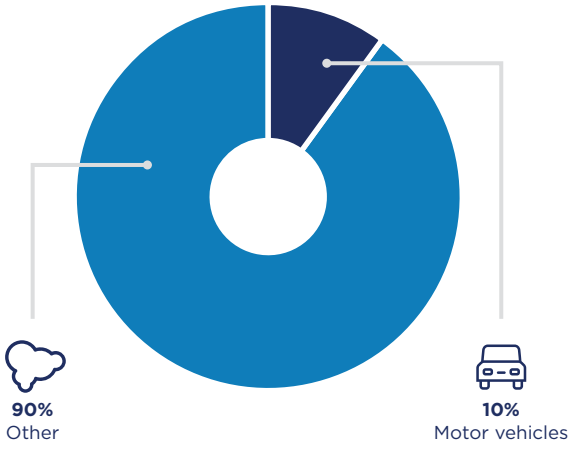
VOC



$PM_{2.5}$



PM_{10}



EMISSIONS BY VEHICLE TYPE

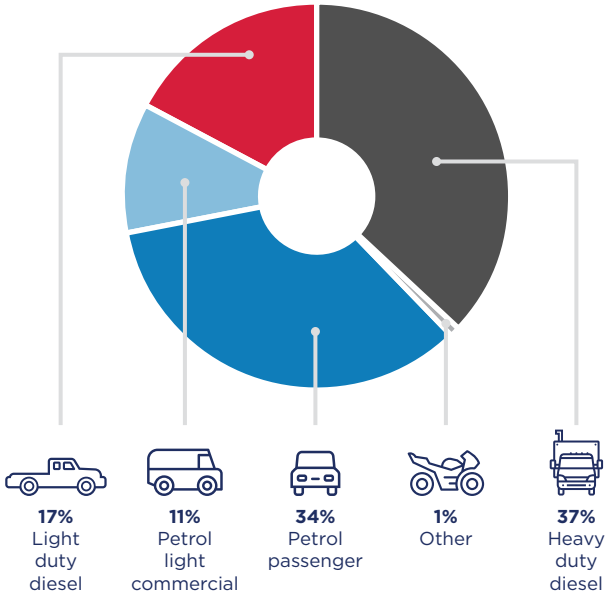
Emissions depend strongly on the type and age of the vehicle and the fuel type. Petrol vehicles dominate VOC emissions with evaporative VOC emissions the largest contributor. Non-exhaust PM emissions from brake, tyre and road wear are significant and larger than combined exhaust PM emissions.

While light vehicles are the most common road vehicles, heavy duty and light duty diesels contribute disproportionally to exhaust emission of particulate matter (both fine and larger particles) and NO_x emissions. While accounting for 25% of total VKT, they contributed 54% of NO_x emissions and 38% of $PM_{2.5}$ emissions from vehicles in the NSW GMR in 2016. This is due in part to the large amount of fuel consumed by heavy vehicles.

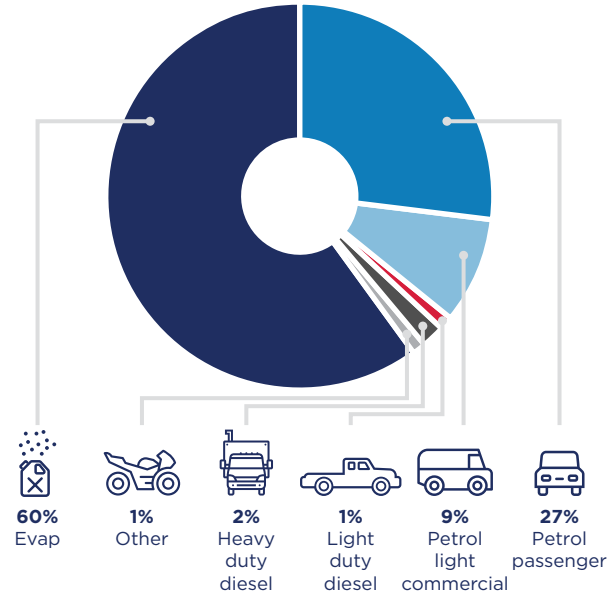
Older diesel light commercial vehicles and rigid trucks are higher emitters of $PM_{2.5}$. Pre-1996 vehicles in those classes emit around 24% of the exhaust $PM_{2.5}$ of the entire vehicle fleet, while accounting for only 1.2% of the VKT.[3]

CONTRIBUTION OF VEHICLE TYPES TO VEHICLE EMISSIONS 2016

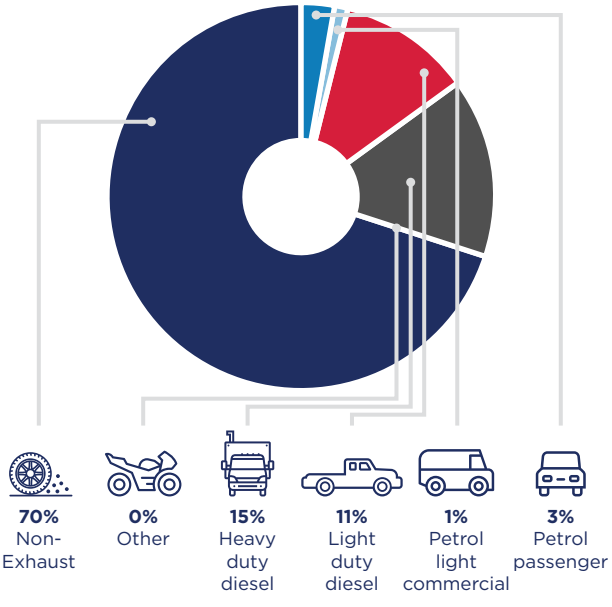
NO_x 2016



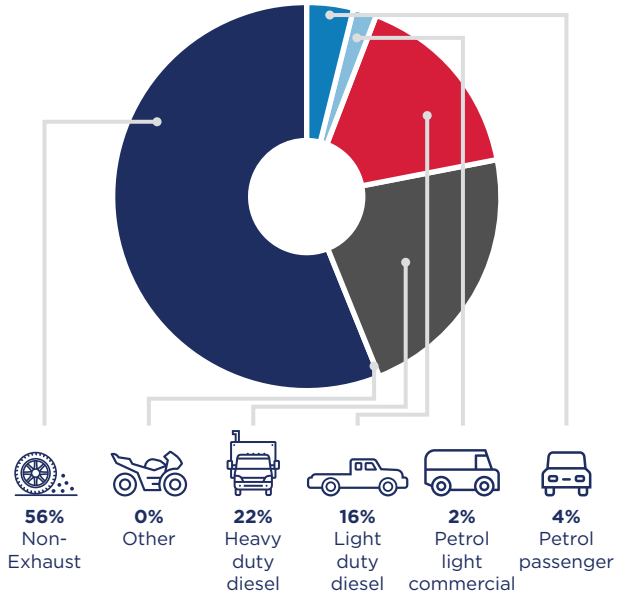
Total VOC 2016



PM_{10} 2016



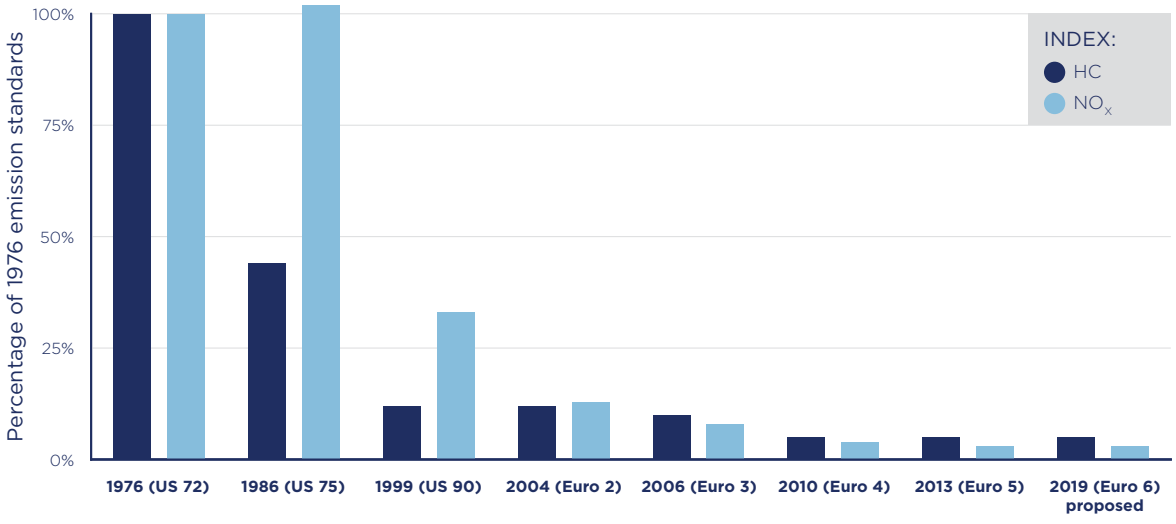
$PM_{2.5}$ 2016



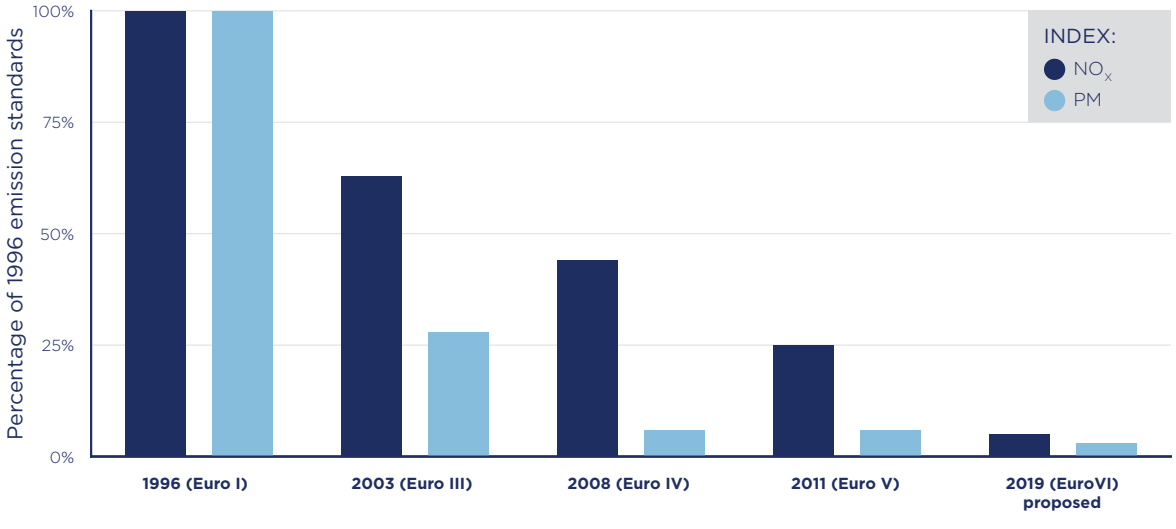
VEHICLE EMISSION STANDARDS

Australian new vehicle emission standards are set nationally in the Australian Design Rules (ADRs), and have been progressively and significantly tightened over the last 40 years.[4] The National Fuel Quality Standards have progressively required cleaner fuels to complement the ADRs and enable use of improved emission control technology.

PETROL PASSENGER VEHICLE EMISSION LIMITS



HEAVY DUTY DIESEL EMISSIONS LIMITS

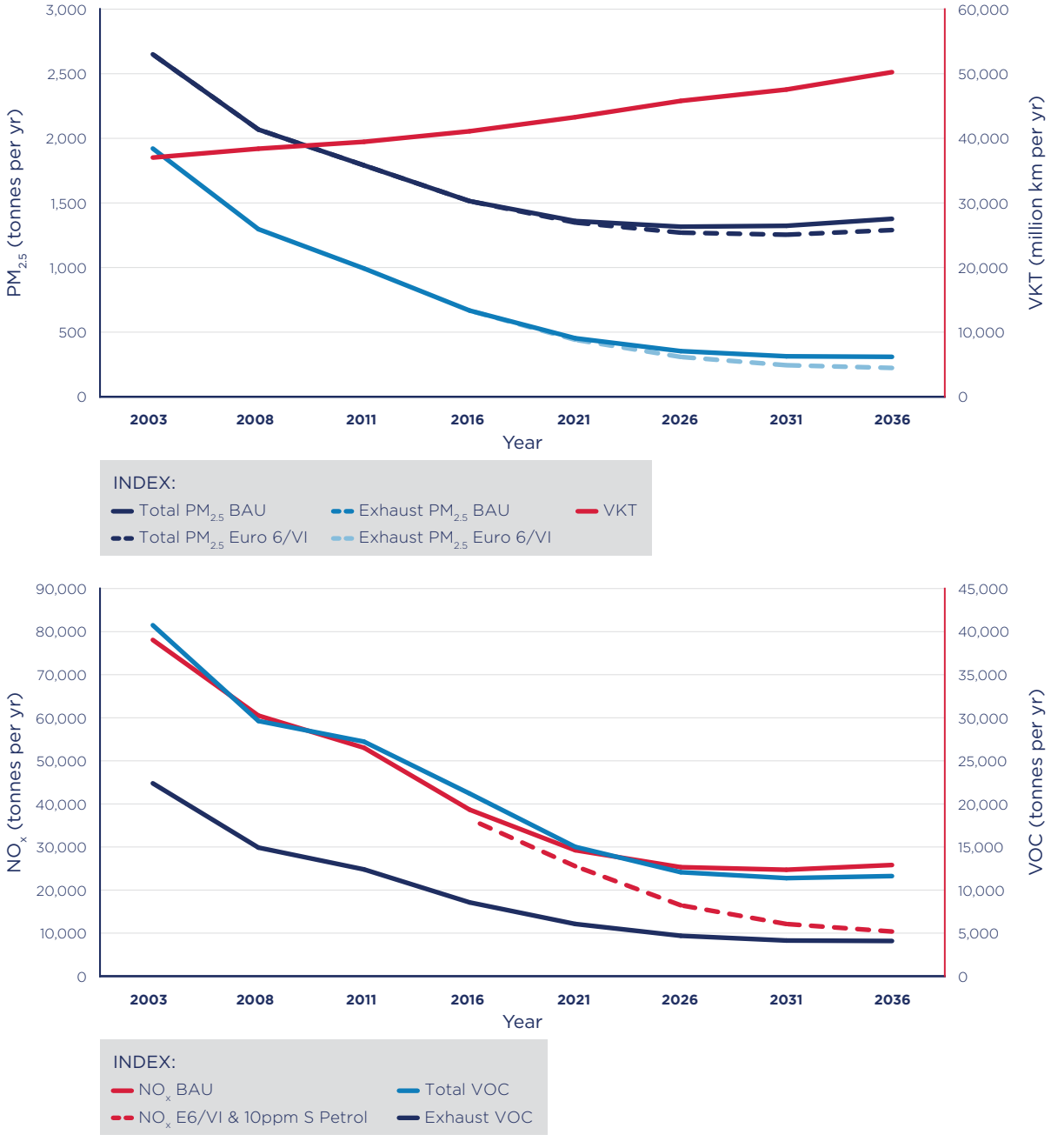


TRENDS IN VEHICLE EMISSIONS

Despite the steady increases in VKT, the strong reduction in vehicle emission rates has resulted in significant reductions in the total fleet emissions, and these reductions are projected to continue for gaseous pollutants through to 2031–36. Emissions are projected to start to increase after this time unless progressively stronger standards continue to be introduced.

As vehicle numbers and travel grow, gains from PM emission standards will be offset by unregulated non-exhaust particulate emission sources, such as tyre, brake and road wear. As there is no current abatement technology or legislated standards for the non-exhaust sources of PM, emissions from this source grow as a direct function of VKT. Hence the total $PM_{2.5}$ reaches a minimum around 2026 and then starts to grow.[3] Adoption of Euro 6 standards for light vehicles, and Euro VI for heavy vehicles will reduce the projected $PM_{2.5}$ exhaust emissions and significantly reduce projected NO_x emissions.

PROJECTED NSW GMR MOTOR VEHICLE EMISSIONS (EPA, 2012)



1 http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0007/54790/Road-Tunnels_TP01_Trends_inMotor_Vehicles_and_Their_Emissions.pdf, Figure 3.

2 EPA 2012. Air Emissions Inventory for the Greater Metropolitan Region in NSW for the 2008 Calendar Year, Technical Report 1. http://www.epa.nsw.gov.au/air/airinventory2008.htm

3 EPA 2012. Air Emissions Inventory for the Greater Metropolitan Region in NSW for the 2008 Calendar Year, Technical Report 7. http://www.epa.nsw.gov.au/air/airinventory2008.htm

4 https://infrastructure.gov.au/roads/environment/emission/