



Smoky Vehicle Reporting Program

2018-19 Annual report



CleanRun

Let's drive down emissions

Smoky Vehicle Reporting Program

2018–19 Annual report

Department of Water and Environmental Regulation

June 2020

Department of Water and Environmental Regulation
Prime House, 8 Davidson Terrace
Joondalup Western Australia 6027
Locked Bag 10 Joondalup DC WA 6919

Phone: 08 6364 7000

Fax: 08 6364 7001

National Relay Service 13 36 77

dwer.wa.gov.au

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1 The Smoky Vehicle Reporting Program

This report summarises the data and observations collected by the Smoky Vehicle Reporting Program (the program) between July 2018 and June 2019.

It is published to promote transparency in the program and provide feedback to people who submitted a smoky vehicle report during the year.

1.1 Program overview

The program is a joint initiative of the Department of Water and Environmental Regulation (DWER) and Department of Transport (DoT). It aims to:

- identify vehicles that are at risk of breaching vehicle emission legislation
- engage with vehicle owners to undertake any necessary vehicle maintenance.

The program is a key initiative of the National Environment Protection (Diesel Vehicle Emissions) Measure 2001 and the *Perth Air Quality Management Plan*.

When identifying whether a vehicle is breaching emission legislation and can be classified as 'smoky', the program follows Regulation 354 of the *Road Traffic (Vehicles) Regulations 2014*, which relates to the visible emissions of certain motor vehicles:

- (1) This regulation applies to a motor vehicle that is propelled by an internal combustion engine and was built after 1930.
- (2) A motor vehicle mentioned in sub regulation (1) must not emit visible emissions for a continuous period of at least 10 seconds.
- (3) This regulation does not apply to emissions that are visible only because of heat or the condensation of water vapour.

In line with this, a smoky vehicle is one which emits visible emissions for at least 10 continuous seconds.

The program is a community engagement initiative to address public concerns about vehicle emissions and to encourage vehicle owners to take action, such as vehicle maintenance. It complements the regulatory effort of WA Police and authorised officers in identifying excessively polluting vehicles and issuing compliance notices.

1.2 How the program works

Members of the public who identify vehicles which smoke continuously for 10 seconds or more can submit reports to DWER. DWER and DoT then verify the details in those reports and notify the vehicle owner, who is invited to respond. Those responses are collected and statistical data on reported vehicles is compiled for analysis.

Privacy

DWER does not have access to vehicle owner information and DoT does not have access to reporter information. This separation of data protects the privacy of reporters and vehicle owners, and the integrity of the program.

Making a report

DWER maintains an online reporting portal through which anyone can report a smoky vehicle's details (available at www.der.wa.gov.au/your-environment/reporting-pollution/report-smoky-vehicles). The data reported, which allows vehicle owners to be identified, includes:

- The vehicle body type, licence number, make and model, and colour
- The location, date and time of sighting
- The reporter's name and contact details.

Photographic evidence can also be provided but is not essential. Reporters are sent a notification email to confirm their submission. If a report is incomplete or unclear, they may be contacted for further information.

Report verification

To mitigate against malicious and vexatious reporting, all reports are verified:

- Reports are checked for basic errors, such as mistyping of the vehicle licence number. Obvious mistakes are either queried or rejected.
- If the notification email sent to the reporter is rejected, a bounce-back email will be received, and the report will be discarded.
- After the information identifying reporters is removed, batches of reports are sent to DoT every two months. DoT extracts vehicle owner, make, model and colour data from its database and sends DWER the vehicle make, model and colour data for cross-checking against reports. Those with obvious mismatches are rejected.

Vehicle owner notification

After verification, reports are sent to a third party, which prints notification letters on behalf of DWER and DoT using the vehicle details from the reports. The letters are sent to vehicle owners, along with a reply-paid card to allow them to respond to the report.

Vehicle owners complete the reply-paid card with their licence number and fuel type, and provide a response to the report, which can include:

- Vehicle repaired, or scheduled for service
- Vehicle does not smoke for 10 continuous seconds
- Cannot afford to repair vehicle
- Vehicle has been sold or disposed
- Vehicle details incorrect
- Other – please give details.

These responses are recorded against each report. Response data is analysed annually for observations and trends.

Vehicle owners can contact DWER to discuss the letter and reporting program.

1.3 Significant program changes

No significant program changes were made during 2018–19.

1.4 Acknowledgements

This program exists and continues to operate thanks to the efforts of members of the public who care about the air that they and others breathe.

For those reading this summary who have submitted a smoky vehicle report – know that you are making a difference. We hope you continue to make reports and would also encourage your acquaintances to report the smoky vehicles they see. Having a diverse range of people reporting to the program improves coverage and helps build a bigger picture of where vehicle emission issues are occurring.

If you have received a smoky vehicle letter and have taken action to repair, service or retire your vehicle, we hope you enjoy the reduced operating costs and the knowledge that you've reduced the impact of your vehicle on local air quality. Vehicle emissions are a significant source of air pollution in urban environments – any reduction makes a real difference to your community.

2 Program performance

2.1 Reporting data

Figure 1 shows the program's recent reporting history. In 2018–19, the program:

- received 482 valid reports
- verified 417 valid reports and sent letters to identified vehicle owners
- received 226 responses from letters sent.

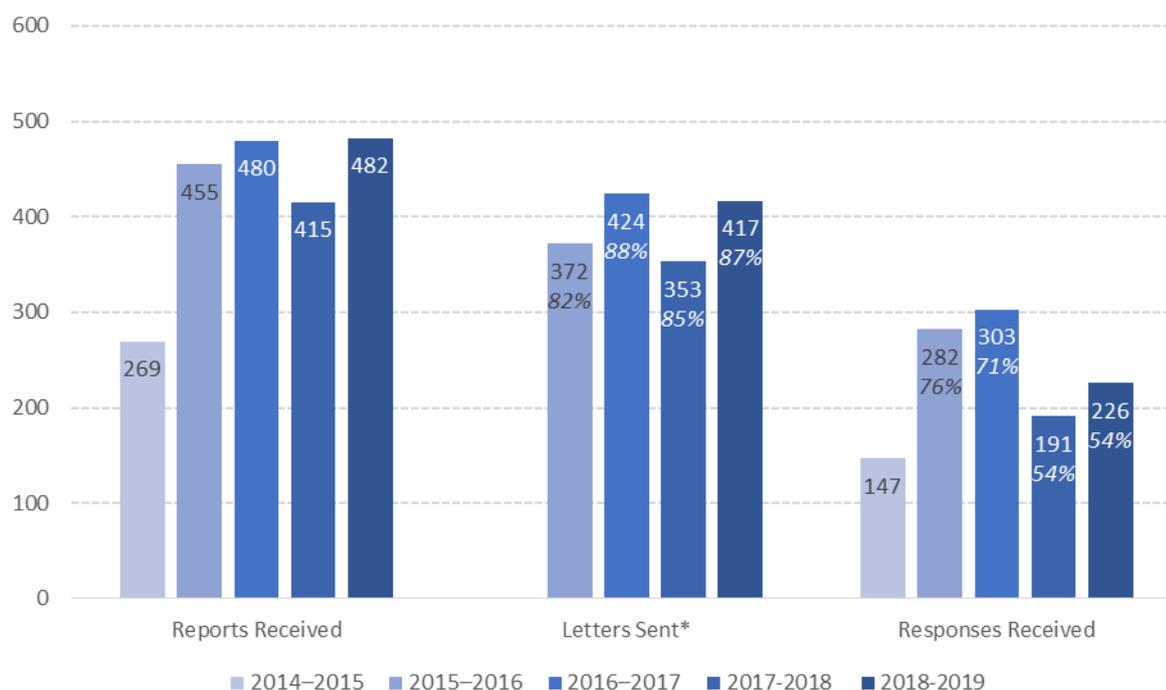


Figure 1: Annual reporting and response data

* 'Letters sent' data was not tracked before 2015–16

The number of reports received, and letters sent, in 2018–19 was higher than the previous year, and comparable to the 2015–16 and 2016–17 reporting periods.

The response rate for letters sent to vehicle owners in 2018–19 was 54 per cent, which was substantially lower than the 2016–17 rate of 71 per cent and the 2015–16 rate of 76 per cent, but identical to the 2017–18 rate. It is unclear why such a large drop occurred for 2017–18 and continued for 2018–19. One possible explanation could be the better targeting of smoky vehicles as a result of changes to the reporting form, and a reluctance among smoky vehicle owners to respond if they do not intend to take corrective action.

2.2 Reporting frequency

The monthly reporting rate for the past few years is presented in Figure 2.

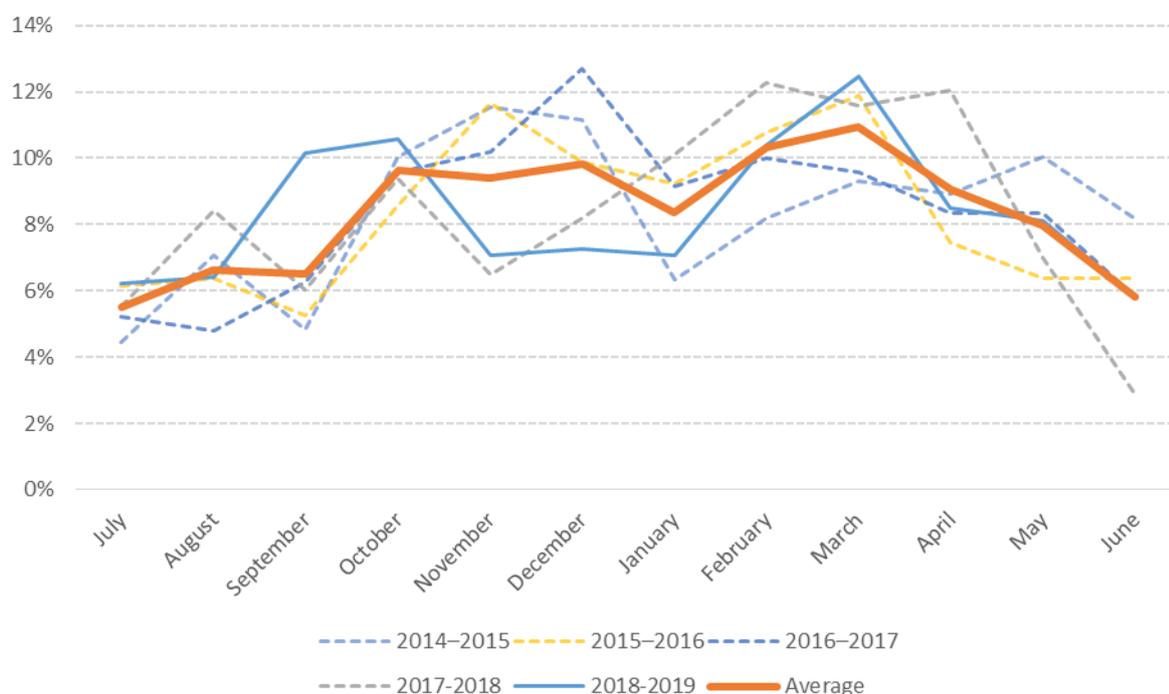


Figure 2: Reports received per month

The 2018–19 period deviated from previous years, with fewer reports received from November to January, and more reports received during March and between September and October compared to the average.

It is still unknown if there are specific factors influencing why reporting frequency varies over the year. Considerations include:

- weather influencing visibility of exhaust
- seasonal variance in driver activity or behaviours, such as air-conditioner use
- seasonal fuel quality variation, such as a change in Reid Vapour Pressure.

2.3 Repeat vehicle reports

In 2018–19, 27 vehicles were reported more than once, and 13 of these were reported twice or more within 30 days. Of the vehicles reported more than once, only six vehicle owners responded to the advisory letters sent.

Five vehicles were reported three times. No response was received to the advisory letters sent to these vehicle owners.

2.4 Response data

Responses received in recent years are summarised in Figure 3.

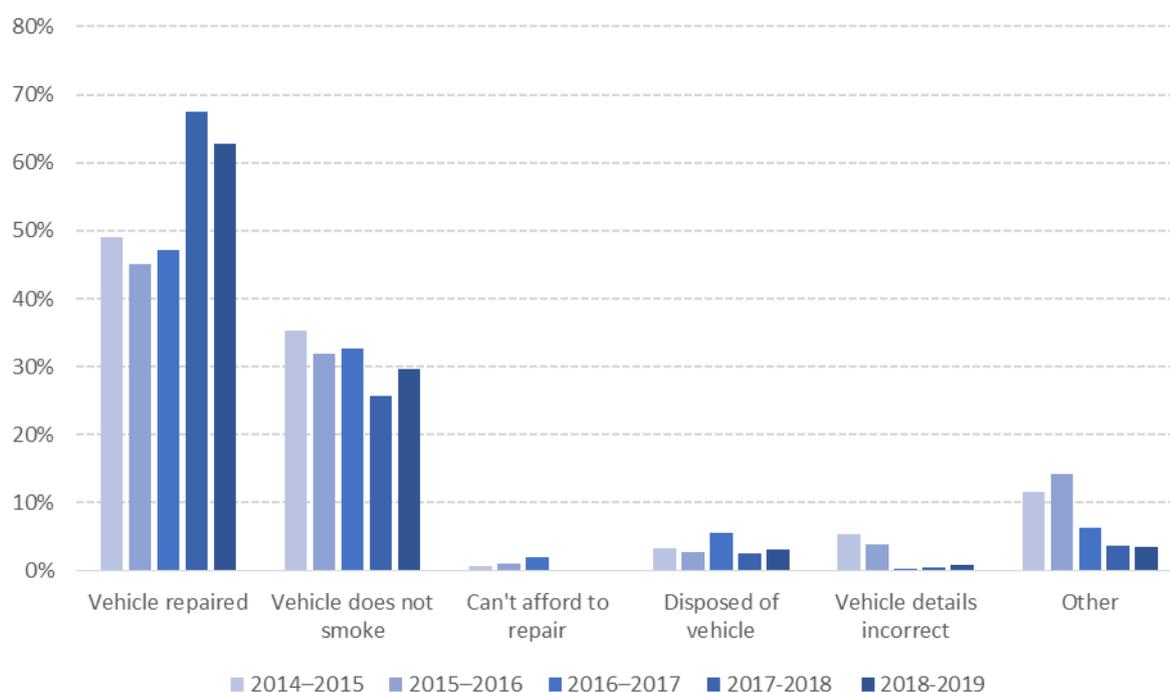


Figure 3: Distribution of responses received

Nearly two-thirds of responses received in 2018–19 indicated the vehicle owner had repaired their vehicle or scheduled it for servicing after being notified. This was a significant increase compared to historic levels of 45–50 per cent for this response.

It is believed to be the result of a screening question at the top of the reporting form, which was introduced in 2017–18 and asks reporters to confirm that the vehicle was smoking for 10 continuous seconds. The influence of ‘super reporters’ in the previous two years (see Section 2.5) was also a factor.

The ‘vehicle does not smoke’ response returned to a 30 per cent response rate, comparable to historic levels. The increase in 2018–19 is proportional to the decrease in 2018–19 for ‘vehicle repaired’ responses compared to 2017–18.

Responses categorised to other groups remain low with only 17 (8 per cent) of responses received in 2018–19 falling outside the two main categories.

2.5 Reporter diversity

It is important to consider the diversity of the reporter base when assessing the significance of the dataset. A high percentage of unique reporters dilutes the risk of observational bias in the dataset. A very small number of heavy reporters can potentially impact the proportion of responses received if they do not properly observe the 10-second rule. An example of this is the reporting of vehicles that puff smoke on take-off but not for 10 continuous seconds.

An additional benefit of a wide reporter base is the likelihood of improved spatial coverage, though this is no guarantee and there is insufficient data collected for any meaningful spatial analysis of reports received. A wide reporter base can also be used

as a proxy to measure community awareness of the program, though it is noted that several factors can influence reporter participation levels.

Reporter diversity, depicted in Figure 4, shows that the number of unique reporters has increased since 2014–15. Relative diversity in 2018–19 was comparable to 2017–18 but much higher than historic diversity. Since the program is not actively advertised, the increase is driven entirely by passive means, such as word of mouth and internet searches, or from awareness sparked by being reported personally.

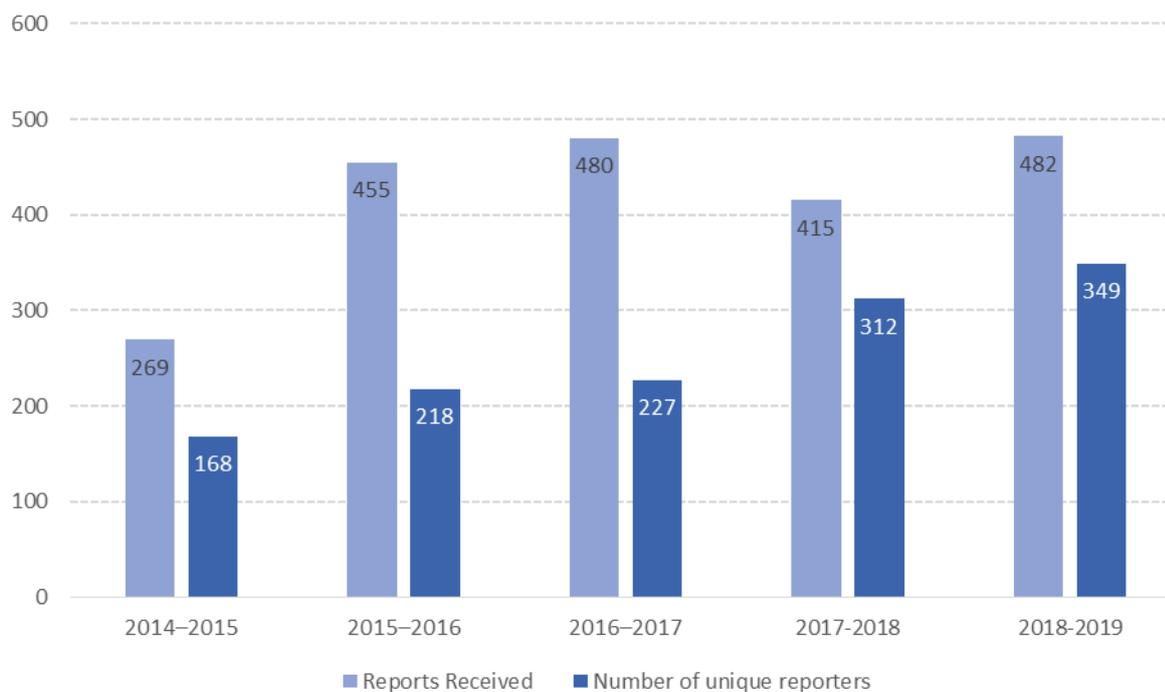


Figure 4: Number of unique reporters annually

Further interrogation of historic data found that a very small number of super reporters submitted between 30 and 100 reports annually in 2015–16 and 2016–17. Analysis of the responses received from vehicles identified by super reporters found the ‘vehicle does not smoke’ response was approximately 10 to 20 per cent higher than the average from the entire reporter base.

For 2018–19, only three reporters submitted 10 or more reports, and there were insufficient responses to those to determine a bias in reporting.

2.6 Reported vehicle analysis

Collection of detailed vehicle data started in November 2017. Of the data available, fuel type, year of manufacture and odometer data were selected as most relevant in assessing vehicles with respect to the production of excessive exhaust smoke.

Fuel type

Four out of five reported vehicles were diesel powered. Roadside measurements taken in recent years by DWER have established that diesel vehicles produce higher emissions of particulates compared to other fuels like petrol. Particle emissions

contribute to visible exhaust smoke (see <https://www.der.wa.gov.au/our-work/programs/204-cleanrun-roadside-emissions-monitoring>).

Diesel engines can produce a short puff of smoke when accelerating until air intake is sufficient to more completely combust the volume of diesel being injected into the cylinders. This can be more noticeable when the vehicle is under heavy load.

Given that the program uses the 10-second rule as defined by the Road Traffic (Vehicles) Regulations 2014, these smoke puffs do not necessarily make the vehicle 'smoky'.

Driver behaviour can also strongly influence smoke emissions. Vehicles that are accelerated heavily or towing overweight trailers are more likely to smoke. When driven smoothly with gentle acceleration, steady speed and the correct gear choice, emissions are significantly reduced, and vehicles are less likely to smoke.

Only two LPG vehicles were reported to the program in 2018–19. This is more reflective of the popularity of the fuel in the WA fleet rather than emissions performance.

Year of manufacture and odometer data

There was little observed correlation between year of manufacture and vehicles reported as soon-to-be-repaired or serviced (it is assumed that a vehicle booked for repair or service is confirmation that it is smoky), shown in Figure 5.

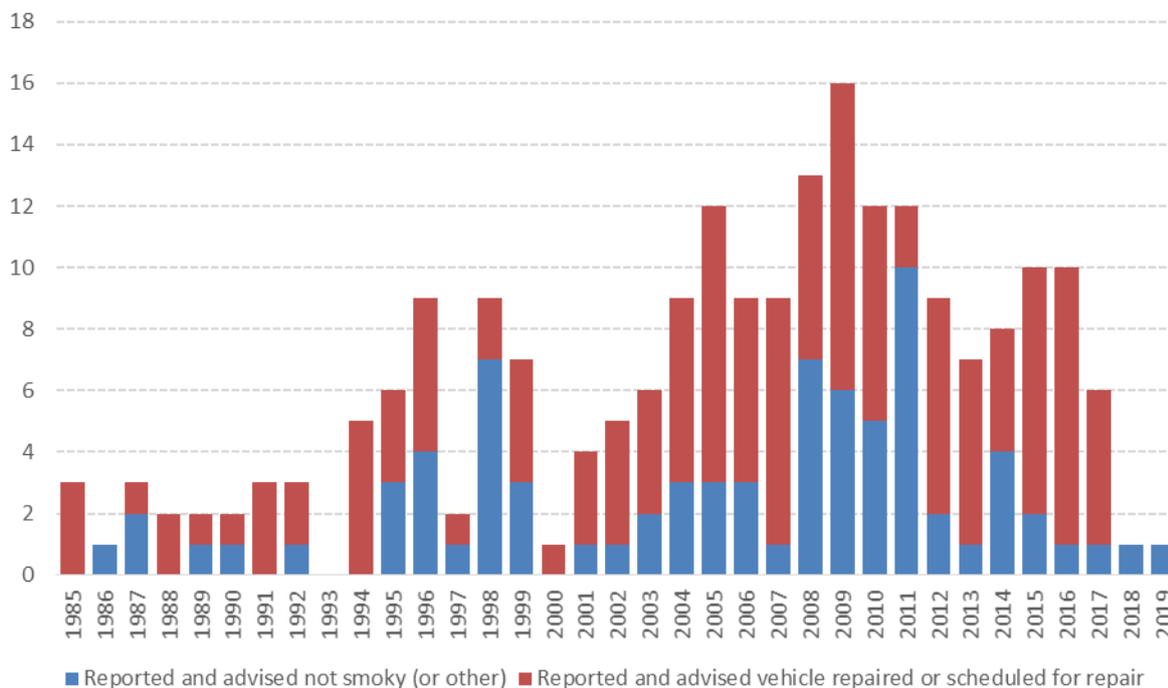


Figure 5: Responses received by year of manufacture

Newer vehicles were more frequently reported than older vehicles, which is a likely function of more new vehicles on WA roads than older cars.

Testing the relationship, if any, between reported vehicles and the wider WA vehicle population by year was considered. But such a comparison was not believed to be representative or useful given the dominance of Perth-based-vehicle reporting and the

difference between Perth’s fleet profile and the rest of the state. Similarly, we considered trying to group vehicles by Australian Design Rules (ADR) to better assess the influence of manufactured emission standards and to provide fewer but larger groups for better statistical analysis. But this was not feasible given the diversity of standards represented in the fleet and the relatively small size of the reported-vehicle pool.

When looking at average vehicle odometer data in Figure 6 and Figure 7 for vehicles which were reported as soon-to-be-repaired or serviced, there does not appear to be any relationship between vehicle activity and the likelihood that it is smoky.

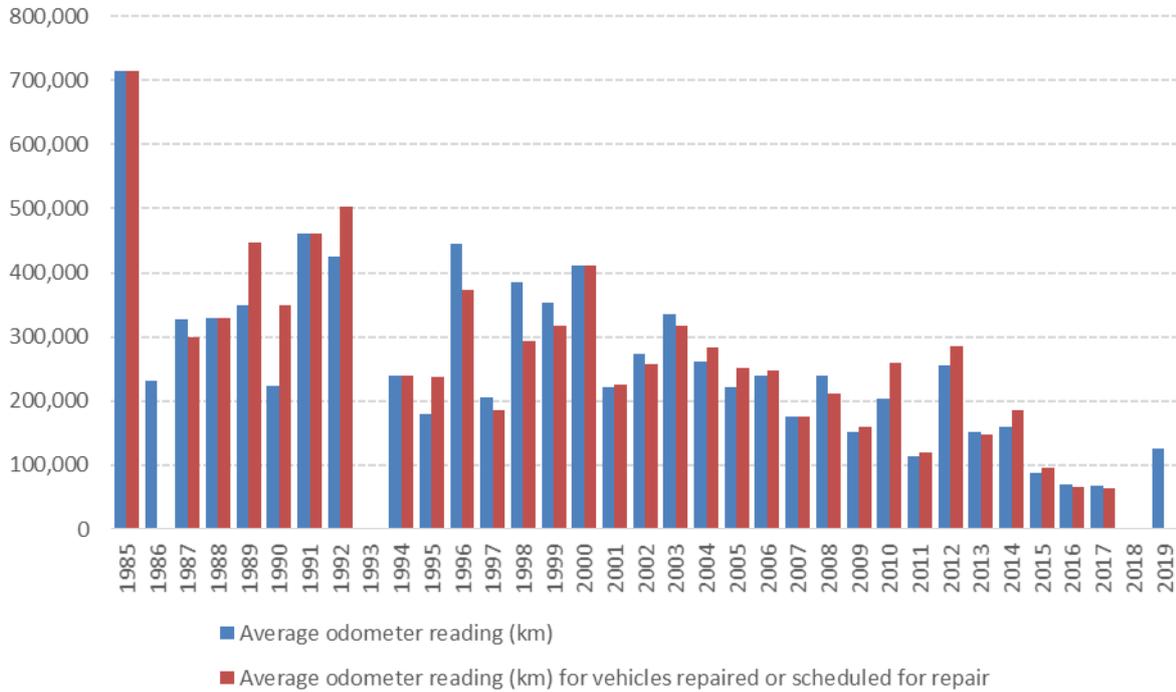


Figure 6: Average odometer data by year of manufacture for responding vehicles¹

¹ For Figure 6 and Figure 7, no vehicles manufactured in 1993 (3 reported) or 2018 (2 reported) included odometer data in responses provided. Kilometers per year were not calculated for 2019 manufactured cars in Figure 7.

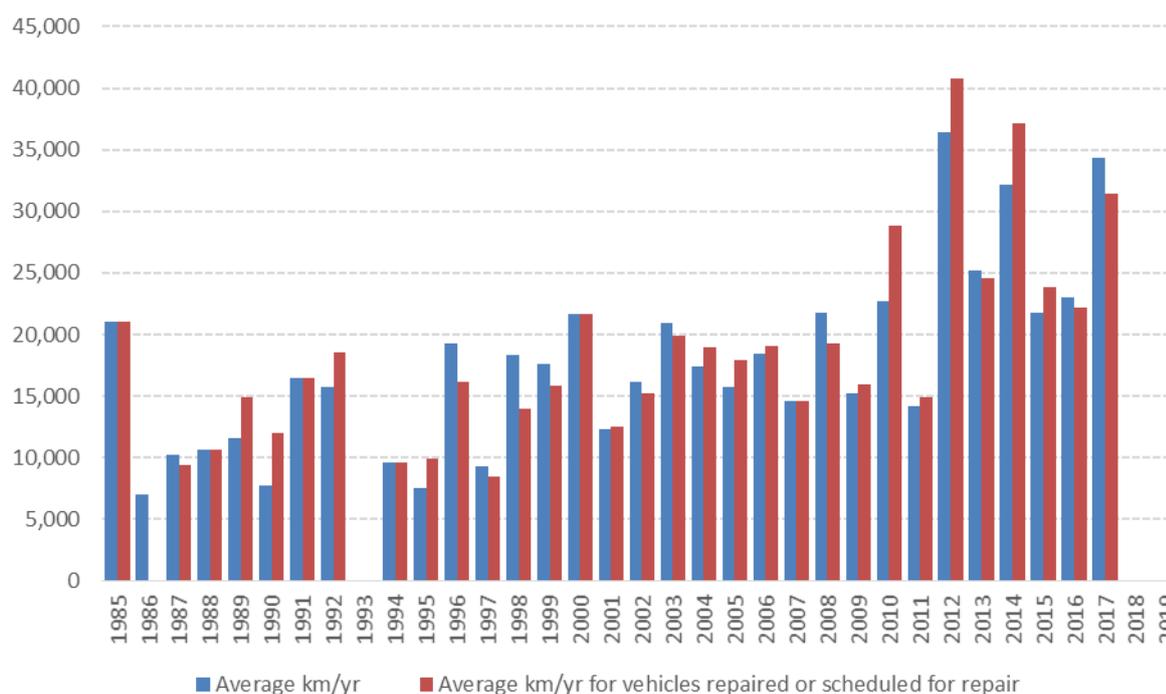


Figure 7: Average kilometres travelled per year for responding vehicles¹

Most vehicles reported to the program appear to be averaging between approximately 10 000 and 20 000 kilometres a year. However, reported vehicles manufactured between 2012 and 2017 appear to have higher annual activities than the rest of the fleet. Further analysis found that 43 of the 46 relevant reported vehicles were diesel makes and models associated with commercial activity, which could explain the higher annual activity limited to this year range. A similar observation was identified in the 2017–18 annual report, but further investigation is required.

2.7 Further information

To obtain further information about the program and the data collected, contact the Department of Water and Environmental Regulation at smokyvehicles@dwer.wa.gov.au.

