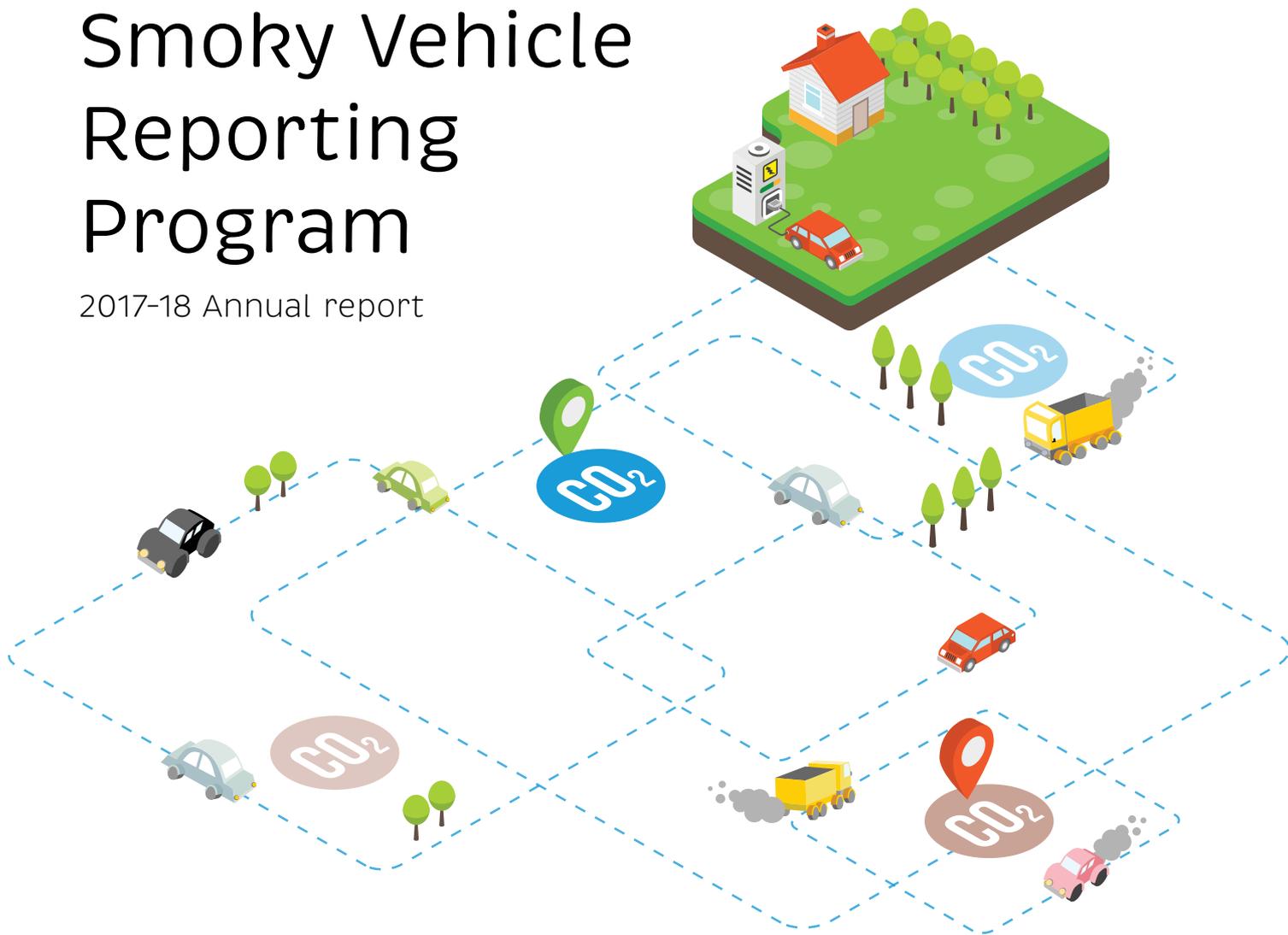




Smoky Vehicle Reporting Program

2017-18 Annual report



CleanRun
Let's drive down emissions

Smoky Vehicle Reporting Program

2017–18 Annual report

Department of Water and Environmental Regulation

July 2019

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July 2019

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Contents

1	The Smoky Vehicle Reporting Program	1
1.1	Program overview.....	1
1.2	How the program works.....	1
	Privacy	2
	Making a report.....	2
	Report verification.....	2
	Vehicle owner notification	2
1.3	Significant program changes.....	3
	Reporting form update	3
	Improved vehicle owner feedback and data collection	3
	Publication of annual reports and reporting statistics	3
1.4	Acknowledgements	4
2	Program performance	5
2.1	Reporting data	5
2.2	Reporting frequency	6
2.3	Repeat vehicle reports.....	6
2.4	Response data.....	6
2.5	Reporter diversity.....	7
2.6	Reported vehicle analysis.....	8
	Fuel type	8
	Year of manufacture and odometer data	9
2.7	Further information	11

Figures

Figure 1:	Annual reporting and response data.....	5
Figure 2:	Reports received per month	6
Figure 3:	Distribution of responses received.....	7
Figure 4:	Number of unique reporters annually	8
Figure 5:	Reports received by year of manufacture.....	9
Figure 6:	Average odometer data by year of manufacture for vehicles reported	10
Figure 7:	Average kilometres travelled per year for vehicles reported.....	11

1 The Smoky Vehicle Reporting Program

This report summarises the data and observations collected by the Smoky Vehicle Reporting Program between July 2017 and June 2018.

It is published to promote transparency in the program and provide feedback to people who submitted report(s) to the program during the year.

1.1 Program overview

The Smoky Vehicle Reporting 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 subregulation (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 program 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 owners of the vehicles, who are given an opportunity to respond. Those responses are collected and statistical data on reported vehicles is compiled.

No advertising or external promotion of the program is undertaken.

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](http://www.der.wa.gov.au/your-environment/reporting-pollution/report-smoky-vehicles) 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. 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

The received 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 the program.

1.3 Significant program changes

In 2017–18, the program was updated in several areas to increase the reliability of the data received and improve feedback to the public.

Reporting form update

A minor but significant update to the program was the addition of two screening questions at the start of the online reporting form, which asked reporters to confirm:

- The vehicle was seen in Western Australia or is a Western Australia-registered vehicle.
- The vehicle was producing continuous visible smoke for 10 seconds.

The first screening question eliminated the erroneous reports the program regularly received from the United Kingdom, India and the state of Washington in the United States of America.

The second screening question was intended to reduce reports for vehicles that ‘puffed’ smoke during acceleration from traffic controls or gear changes, but were otherwise not continuously smoking during routine operation and not meeting the ‘10-second rule’. The reduction of reports received this year and corresponding decrease in vehicle owners advising vehicle is not smoky suggest erroneous reporting has decreased this year as a result of this change.

Improved vehicle owner feedback and data collection

To reduce vehicle owner confusion when replying to the feedback letters sent by DoT and DWER, the options to select from on the reply paid card were reviewed and made more specific.

Vehicle owners are now also asked to provide vehicle odometer data in their response. Western Australia vehicle odometer data is not routinely collected by regulators, and the data is valuable in understanding what sort of vehicles are likely to be or become smoky. The data also assists in the development of vehicle emission inventories for Western Australia.

Finally, additional vehicle data from DoT is now collected for reported vehicles, including year of manufacture, fuel type, weight and body type. This data assists in understanding the profile of vehicles at risk of being or becoming smoky.

Publication of annual reports and reporting statistics

Until 2017–18, the program had no feedback mechanisms to communicate how effective the program was in addressing smoky vehicle pollution in Western Australia.

The first annual report for the WA Smoky Vehicle Reporting Program was published in April 2018. The annual report summarised the performance of the program, and also detailed how the program operated in an effort to enhance transparency and improve public engagement outcomes. A link to the annual report appears after submitting a

smoky vehicle report. It is also on the main page of the Smoky Vehicle Reporting Program's website.

Further to the publication of annual reports, the program now maintains reporting statistics on its website. These stats are updated bi-monthly and are located adjacent to the link to the reporting form to maximise their visibility.

1.4 Acknowledgements

This program exists and continues to operate thanks to the efforts of all members of the public who care about the air 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 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.

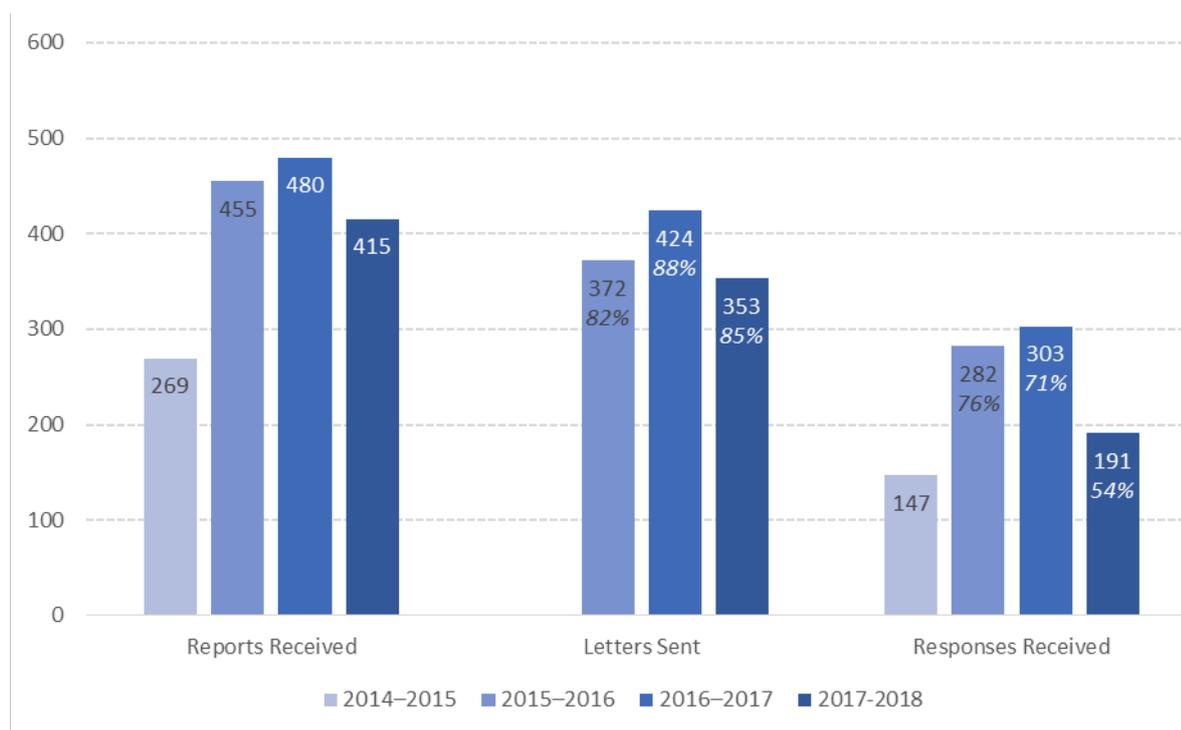
For those who have received a smoky vehicle letter and taken action to repair, service or retire your vehicle, we hope you enjoy not only the reduced operating costs but also the knowledge that you've reduced the impact of your vehicle on local air quality. Vehicle emissions are one the most significant sources 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 recent reporting history for the Smoky Vehicle Reporting Program. In 2017–2018, the program:

- received 415 reports
- verified 353 reports and sent letters to identified vehicle owners
- received 191 responses from letters sent.



'Letters sent' data was not tracked prior to 2015–16

Figure 1: Annual reporting and response data

The number of reports received and letters sent in 2017–18 was lower than the previous two years. The reporting criteria was tightened in 2017–18 by specifically asking reporters to verify on the reporting form that the vehicle was smoking for 10 continuous seconds. While the 10-second requirement was no different from previous years, the new screening question on the form may have helped reporters to better understand it.

The proportion of valid reports in 2017–18 was 85 per cent, which was lower than 2016–17's rate of 88 per cent, but higher than 2015–16's rate of 82 per cent.

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

2.2 Reporting frequency

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

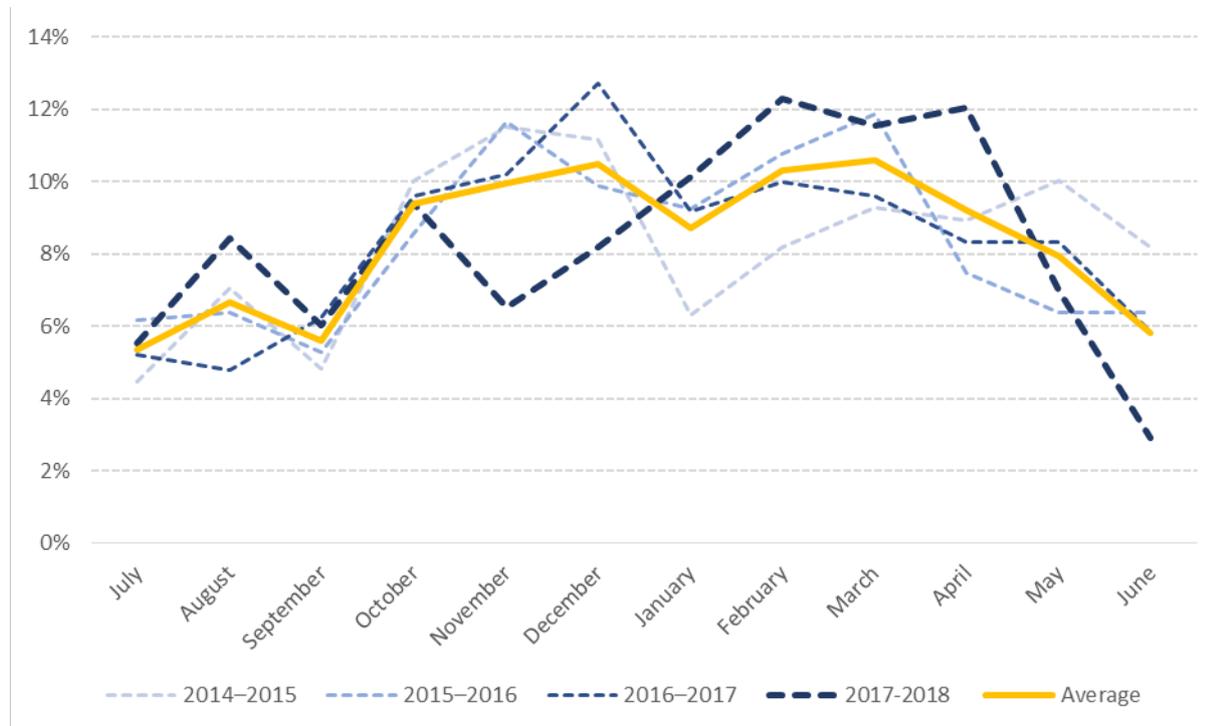


Figure 2: Reports received per month

2017–18 deviated from previous years, with fewer reports received in November and December, and more reports received between January and April compared to the average. There was also a spike of reports in August and a dearth of reports in June.

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 (e.g. air conditioner use)
- seasonal fuel quality variation (e.g. change in Reid Vapour Pressure).

2.3 Repeat vehicle reports

There were 17 vehicles reported more than once in 2017–18, nine of which were reported twice or more within 30 days. Of the vehicles reported more than once, only four vehicle owners responded to the second advisory letter sent.

Two 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.

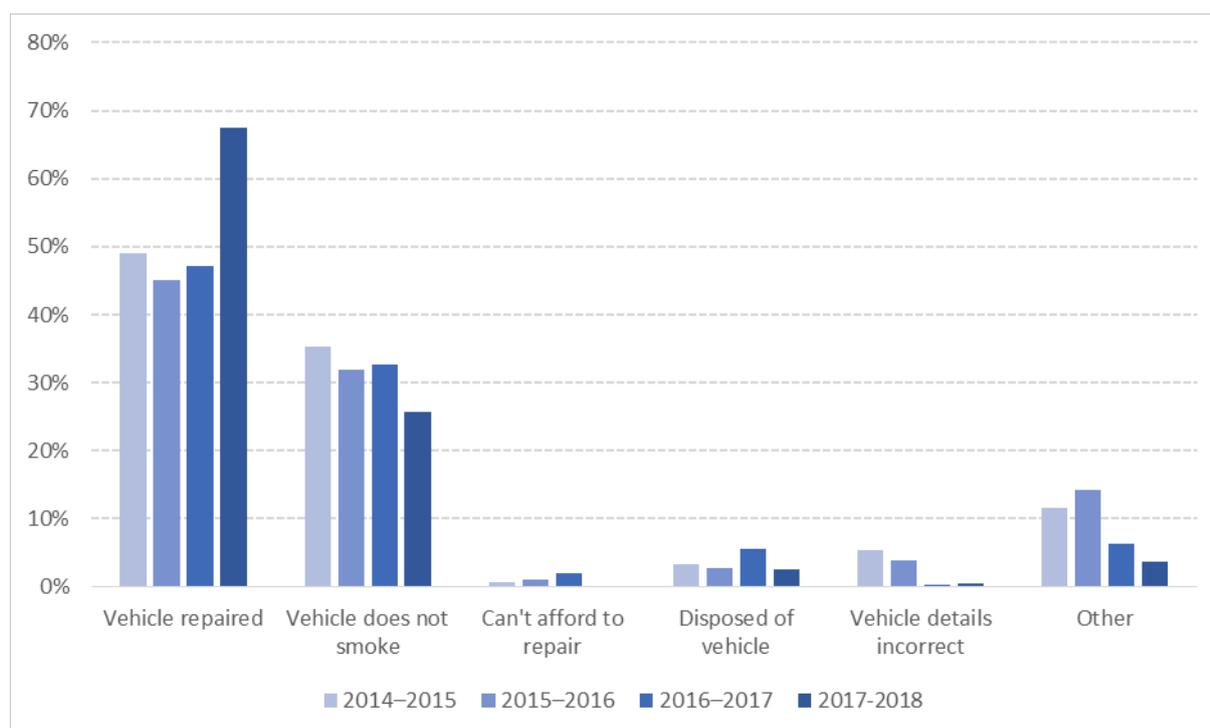


Figure 3: Distribution of responses received

Over two-thirds of responses received in 2017–18 indicated the vehicle owner had repaired their vehicle or scheduled it for servicing after being notified. This was a significant increase compared to previous years' levels of 45–50 per cent for this response. Similarly, responses advising the vehicle does not smoke dropped to 26 per cent, much lower than the 30–35 per cent reported in previous years.

The difference in 2017–18 is believed to be the result of the new screening question at the top of the reporting form, asking reporters to confirm 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 in this change.

Responses categorised to other groups remain low with only 13 total responses received in 2017–18 not fitting into 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 proportions of responses received if they do not properly observe the 10-second rule (e.g. reporting 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 it is no guarantee this occurs, and insufficient data is collected to perform 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 there are several factors that can influence reporter participation levels.

Reporter diversity is plotted in Figure 4 and shows that the number of unique reporters have been increasing since 2014-2015. Of note was the significant increase of unique reporters in 2017-18 despite a decrease in total reports received. The program is not actively advertised, with the increase driven entirely by passive means (e.g. word of mouth, internet searches, awareness of the program after being reported themselves).

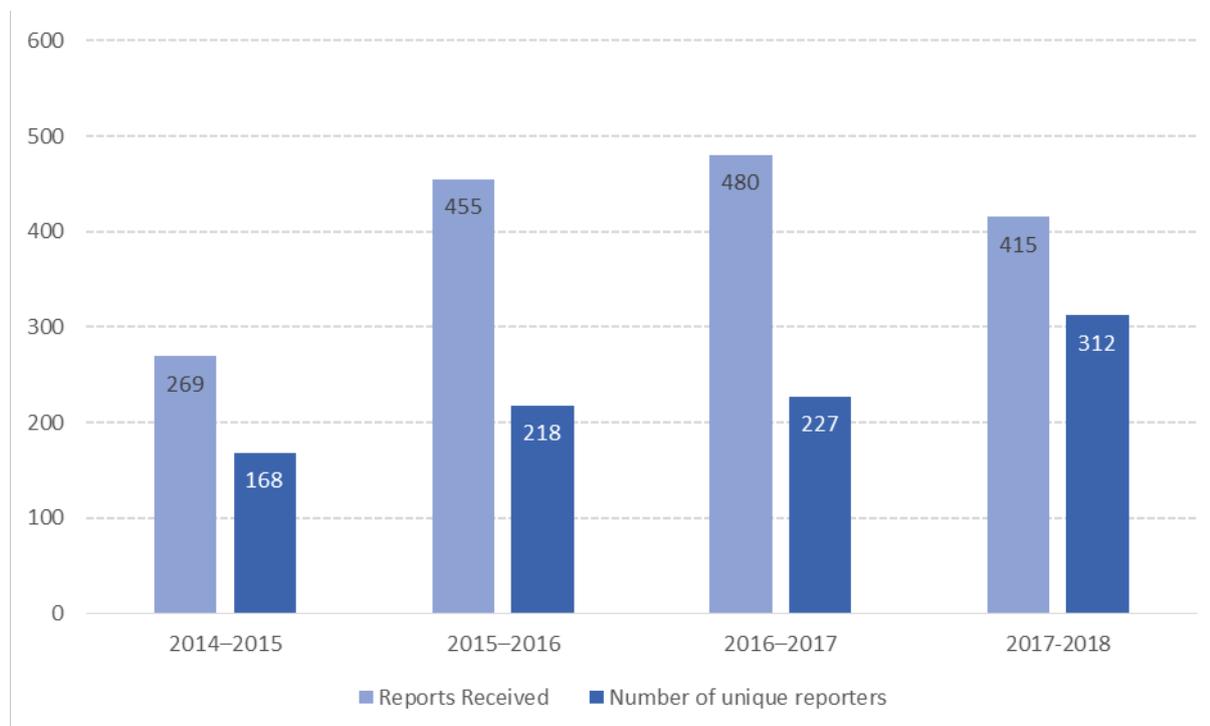


Figure 4: Number of unique reporters annually

Further interrogation of historic data found that 2015-16 and 2016-17 had a very small number of 'super reporters' who submitted between 30 and 100 reports a year. 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. The more frequent reporters in 2017-18 still had a higher than average 'Vehicle does not smoke' response from their reports, but this was offset by the larger reporter base for the year.

2.6 Reported vehicle analysis

Detailed vehicle data started being collected from November 2017 onwards. 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 vehicles reported were diesel powered. [Measurements undertaken by DWER](#) with a roadside monitoring device in recent years have established that diesel vehicles produce higher emissions of particulates, which is part of what makes exhaust

smoke visible, compared to other fuels like petrol (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.

No LPG or alternate fuel vehicles were reported to the program in 2017–18.

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’s going to be repaired or serviced is confirmation of its being smoky), shown in Figure 5.

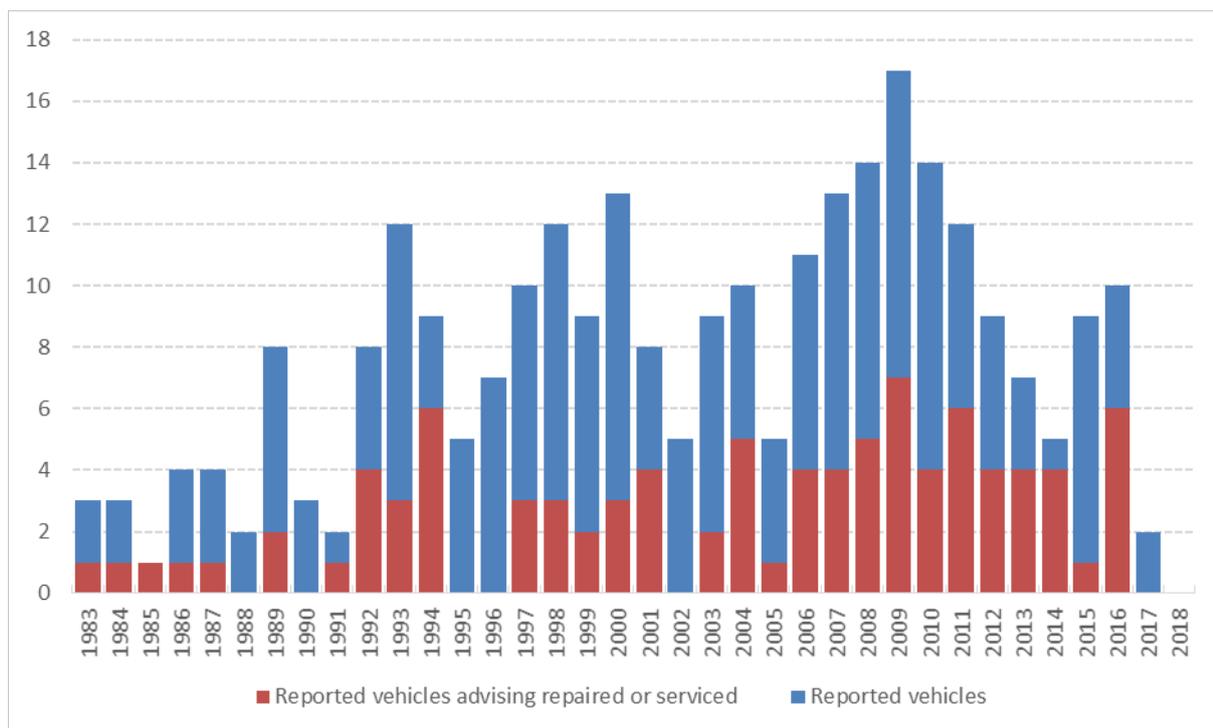


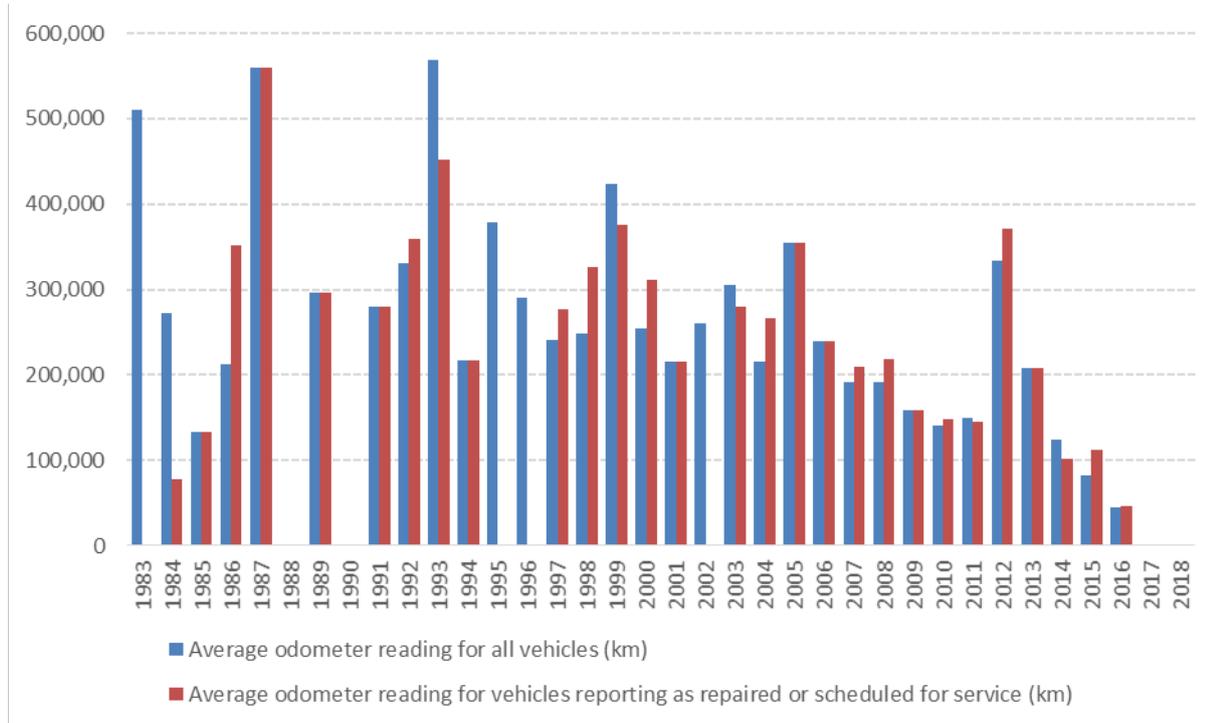
Figure 5: Reports received by year of manufacture

Newer vehicles were more frequently reported than older vehicles, which is likely a function of there being more new vehicles on the road than old.

Testing the relationship, if any, between reported vehicles and the wider WA vehicle population by year was considered, but given the dominance of Perth-based vehicles being reported and the difference in fleet profile between Perth and the rest of the state, such a comparison was not believed to be representative or useful. Similarly, we

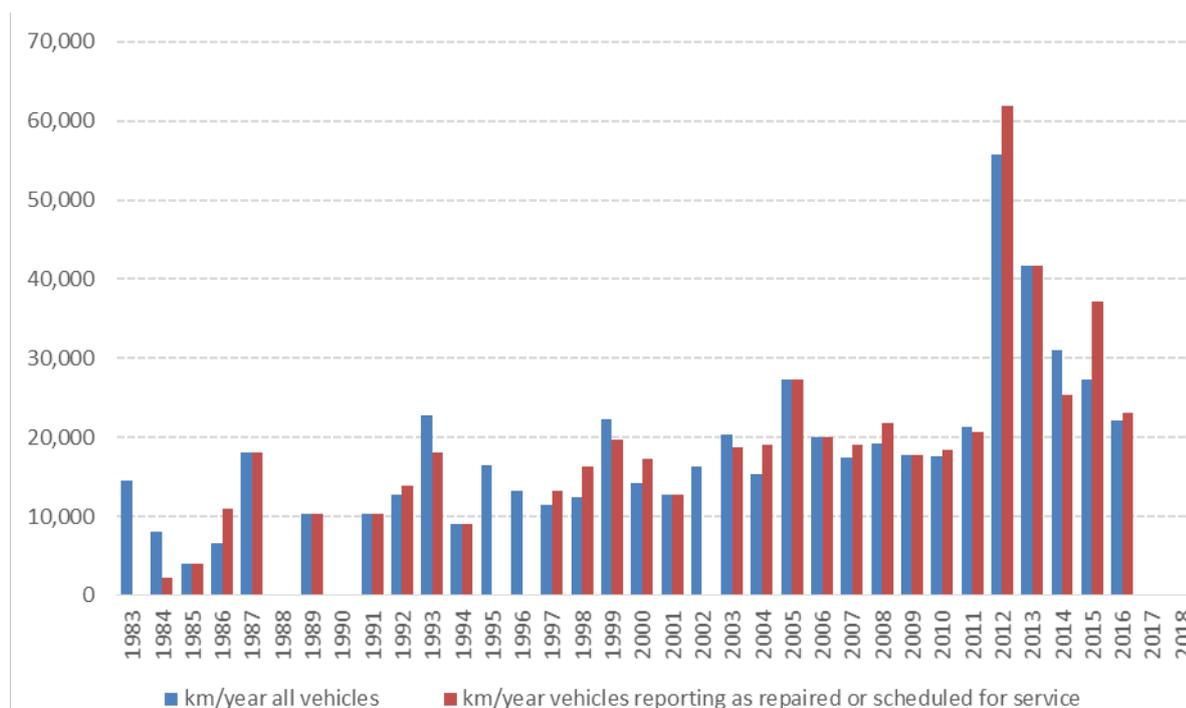
considered trying to group vehicles by Australian Design Rules (ADRs) to better assess the influence of manufactured emission standards and provide fewer but larger groups for better statistical analysis, but this was not feasible given the diversity of standards represented in the fleet and the relatively small size of the reported vehicle pool.

When looking at average vehicle odometer data in Figure 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 likelihood of the vehicle being smoky.



No vehicles manufactured in 2018 were reported to the program. Only two vehicles manufactured in 2017 were reported and neither provided odometer data in their response.

Figure 6: Average odometer data by year of manufacture for vehicles reported



No vehicles manufactured in 2018 were reported to the program. Only two vehicles manufactured in 2017 were reported and neither provided odometer data in their response.

Figure 7: Average kilometres travelled per year for vehicles reported

Vehicles manufactured in 2008 and earlier reported as smoky show on average 200 000 kilometres or greater travelled. Smoky vehicles manufactured after 2008 are mostly between 100 000 and 150 000 kilometres on the odometer.

Most vehicles reported to the program appear to be averaging between approximately 10 000 and 20 000 kilometres a year. However, vehicles reported that were manufactured between 2012 and 2018 appear to have higher annual activities than the rest of the fleet. Further analysis found that 42 of the 45 relevant vehicles reported were diesel and were of makes and models that are associated with commercial activity, which could explain the higher annual activity. Further investigation is required to verify these findings.

2.7 Further information

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

