

A diesel scrappage scheme – could it work?

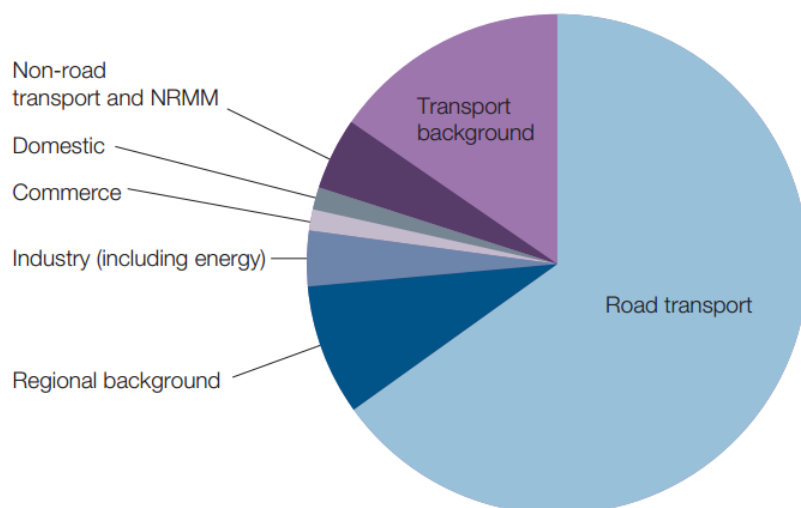
Introduction

The RAC Foundation is an independent transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and motoring. The Foundation carries out independent and authoritative research with which it promotes informed debate and advocates policy in the interests of responsible road users.

The impact of road transport on air quality

Transport activity, especially road transport activity, is a major source of pollutants in areas of poor air quality in the UK – as can be seen in Figure 1 for areas of NO_x emissions exceedance.

Figure 1 Average of nitrogen oxide (NO_x) source apportionment on UK road links outside London exceeding the nitrogen dioxide (NO₂) limit value in 2013

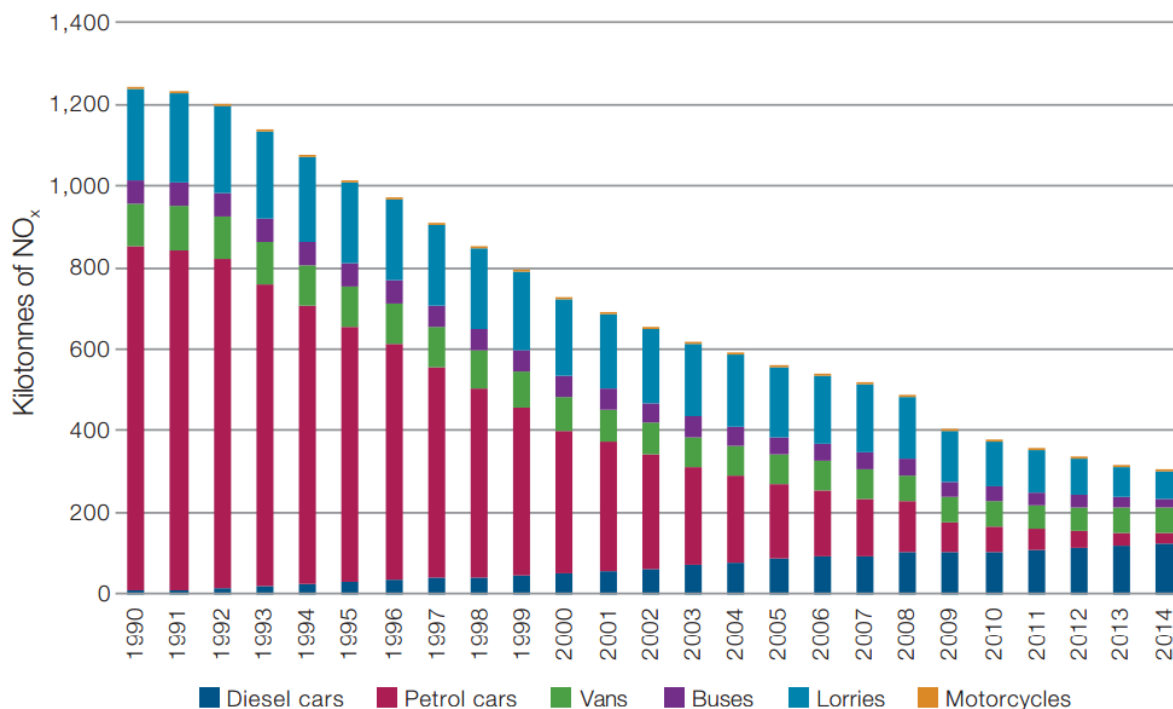


Source: [Defra \(2015\)](#)

Note: NRMM stands for non-road mobile machinery

The latest compliance data, based on 2013 observations, showed 31 (out of 43) [air quality reporting zones](#) for the European Air Quality Directive across the UK were in breach of limit values for NO_x. Despite reductions in road transport NO_x, there has been a dramatic increase in the proportion of NO_x emissions from the diesel car fleet – increasing from virtually nothing in 1990 to 40% of total NO_x emissions from road transport in 2014 (Figure 2).

Figure 2 National road transport emissions of nitrogen oxide (NO_x) by vehicle type



Source: based on data from [NAEI \(2015\)](#)

Diesel scrappage

A scrappage scheme has been suggested (by amongst others, the [IPPR](#) and [TfL](#)) as a financial incentive for people to trade-in older ‘dirty’ diesels and replace them with new, clean vehicles in a way that might be good for emissions and may also be good for stimulating the ultra-low-emission car market (which has a growing manufacturing footprint in the UK – Nissan’s Leaf is already made here and soon so too will Jaguar’s I-PACE).

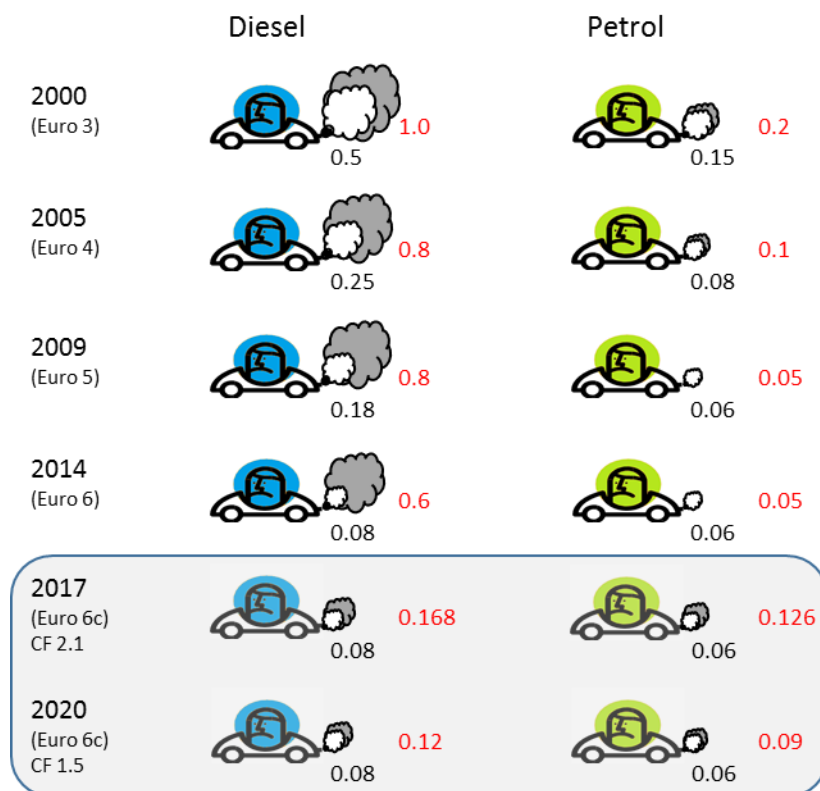
Diesel cars now comprise over a third of the licensed cars in the UK parc - 11.9 million.

Unfortunately, real-world emissions testing has found that diesel-powered cars have not been getting cleaner on the same trajectory as petrol. Diesel cars bought new as recently as 2014 are emitting some 4 times more NO_x per km driven on the road than lab tests would suggest, and approximately 13 times more NO_x per km than petrol cars.

This undermines to some extent the call to scrap older dirty diesels. These newer diesel cars are unlikely to qualify for scrappage, whatever the system, but they are the cars doing the high mileages and if these take place in areas with air quality issues, their contribution to poor air quality can be much higher than an older, low-mileage diesel car.

Figure 3 shows diesels are still relatively dirty for NO_x right up to the current standard, Euro 6 (which shows an improvement on Euro 5) though looking at the parc as a whole still relatively few diesel cars achieve on the road anything like what is required in lab testing. In fact, only with the imminent introduction of Euro 6c (including as it does real driving emissions testing) is there the prospect of a step-change in real-world emissions. Nevertheless, it is true to say that older cars are, generally, dirtier on a per km basis.

Figure 3 NEDC laboratory test limit values for NO_x (white clouds), real-world estimates of NO_x emissions for Euro 3 to 6 and RDE NO_x limits for Euro 6c (grey clouds)



Sources: [ICCT \(2012\)](#); [ICCT \(2014\)](#)

Note: For Euro 6c, the grey clouds represent the maximum allowable NO_x during Real Driving Emissions (RDE) testing which will be a multiple of the lab-based figures. These multiples (known as conformity factors) start at 2.1 in 2017 and decline to 1.5 in 2020. RDE testing might show RDE NO_x levels to be lower than these CF-applied limits.

Diesel cars can be found all over the country and are often chosen for the positive characteristics the diesel engine offers, including: good fuel economy; relatively lower CO₂ emissions; capacity to haul heavy loads; and suitability for powering larger vehicles and for 4x4s (on- and off-road).

A diesel-engine car is still probably a good choice when it is used predominantly for driving long distances at higher speeds through areas of low human density – for example, along motorways - where the better fuel economy a diesel offers over petrol comes into its own; or in rural areas where air quality is not an issue; or when towing a trailer, caravan or horse-box.

As a result of [a High Court ruling](#) requiring a new national air quality plan to be drawn up, it is possible that the Government will conclude that air quality is an issue in more places and over wider areas than targeted in the [Clean Air Zone \(CAZ\) consultation](#) published last year. But it is unlikely that this will lead to legitimate widespread or even country-wide concern for diesel vehicle owners.

There is no reason in principle to want to banish *all* diesels, especially until there is suitable alternative.

It is important to remember that unlike CO₂, poor air quality – and this can include not just excess NO_x but also particulate matter (PMs) etc. – is a location-specific problem, occurring in areas with a high density of emitters: vehicles, industry, large-scale power generation and even, [according to reports in London](#), the use of wood burning stoves. These high levels of emissions become an issue

when they occur in areas where there is a high concentration of people i.e. human exposure to air pollution is high.

Other factors also play a part, such as air temperature and pressure, and street layouts – air is not static, winds can carry particles and pollutants over many miles, including across the Channel, while conversely polluted air can get stuck along streets between tall buildings.

As the conversation about air quality and non-compliance with the [EU air quality directive](#) continues, calls for a scrappage scheme have become more nuanced – for example the [Mayor of London](#) has called on Government to adopt a ‘targeted’ diesel scrappage scheme.

If a scrappage scheme is to have a chance of contributing to achieving compliance with the air quality standards, it would be important to find a way to focus on those vehicles making the greatest contributions to the problem in areas of high human exposure.

That is why it makes sense to target buses, taxis, minicabs and even vans that clearly operate within a CAZ boundary, and have their engines running for much of the day.

For private cars the picture is different. Mostly these will be making more simple in-out commuter, business or shopping trips. So although they are entering the zone they spend a relatively short space of time with their engines running while inside. That time can be extended if they are stuck in congestion.

We do know a certain amount about vehicle mileage which is captured as part of the MoT process, albeit only from the point a vehicle enters the MoT system (currently 3 years after first registration, although [Government is consulting](#) on extending this to 4 years).

Unfortunately, we have no large-scale, accurate datasets to tell us which cars are used where. The vehicle keeper record, hosted by the DVLA, will have an address for the ‘keeper’, which might be far from any CAZ, and the keeper’s address can only give a clue, but no more than that, to knowing where the vehicle is driven. In the case of lease company vehicles, the situation is more acute still. Tens, hundreds or even thousands of vehicles might be registered at a single address. The silver lining is that many fleet vehicles are relatively new (often less than four years old) and hence clean, and unlikely to be considered for scrappage. Potentially you might ask leasing companies – and indeed commercial fleet operators like delivery firms and hauliers – to account for the mileage of their vehicles but this is likely to be met with resistance, not least because companies will fear the data will be used against them in the future; for example, in the form of a per mile charge.

So it is extraordinarily difficult to identify and target privately-owned vehicles, and cars in particular, that are contributors to the poor air quality in areas with exceedances.

If that could be tackled, we then face the cost of replacing them with cleaner cars. Even to start to make a material improvement in air quality [our analysis](#) shows the scrapped cars would need to be replaced with pure electric models. The market in these vehicles is growing, but is by no means mature; the choice of cars is limited and they tend to be more expensive than conventionally fuelled cars – the Renault Zoe, one of the least expensive, has a list price of c.£18,500. There are also issues with range, which is only now beginning to be tackled in the latest models, and refuelling, with inadequate charging facilities, of variable availability, which can require the motorist to master a bewildering set of account, tariff and plug-and-socket combinations.

How might a scrappage scheme work to improve air quality?

If, despite these challenges, we were tasked with devising a scheme, we would:

- Start with buses, taxis and minicabs – these vehicles are high-mileage vehicles, licensed to operate in specific areas so we can be fairly certain that they are [contributing considerably](#) to air quality issues. Vehicles operated, directly or under contract, by local authorities, constabularies and the NHS etc. might also be easy to target by similar logic.
- Next, vans – these are high-mileage vehicles operating mainly in urban areas of concern. Identifying which ones are operating in the urban areas is much more difficult and would require working closely with fleet operators (with the challenges that might entail as listed above);
- Consider (whilst recognising the cost implications) installing ANPR cameras at CAZ boundaries and monitor traffic for a period – 3-6 months – with the aim of tracing the owners of vans and older vehicles identified as repeatedly entering the CAZ...
- ... while this would not tackle how far they were driven – the vehicle may enter, park up for the day, leaving again in the evening hence contributing very little to air quality issues – but the time of day of entry and exit would be a clue, as would repeated entry and exit during the course of the day;
- To go further – at further cost – ANPR monitors could be deployed within CAZs to provide further observations of vehicle movements to give a better indication of the movements of the vehicles within zones;
- Offers of a scrappage sum could then be sent to the registered keepers of those vehicles, which, for older vehicles are unlikely to be lease companies, but are, for many models, likely to be run by lower income households;
- It remains to be seen whether enough money could be offered to bridge the funding gap toward the purchase of a sufficiently clean new car to make a difference to air quality where it matters. Almost invariably, the cars you would want to take off the road will be cheap and the cost of replacing them with a brand new model will be prohibitive – even with a scrappage-scheme contribution – for many owners.
- Arguably – as TfL has suggested – you could attempt to tempt dirty diesel owners (especially less well-off ones) to turn their backs on cars completely by offering a mobility package instead which would give credit towards the use of things like car clubs, public transport and cycle hire scheme.

Conclusion

The issue of air quality continues to rise up the political agenda, not least because of the human cost. [Latest figures suggest](#) that “23,500 deaths annually – 4.3% of total UK deaths – relate to NO₂ pollution”. When combined with deaths linked to particulate matter (PM), and allowing for overlap, 44,750 deaths annually have some link to air pollution, at an annual social cost of £25.3 billion.

In June 2014, [the RAC Foundation said](#) that consideration should be given to a diesel scrappage scheme. But [further work](#) by the Foundation in April 2016, showed that a general scrappage scheme, similar in scale to the one introduced in 2009 to support the car industry, would cut annual NO_x emissions by only 3.2% and that in itself would be dependent on the 400,000 'dirty' diesels taken off the road being replaced by zero emission vehicles. Nor would such a scheme take any account on when and where those most polluting cars were being used.

Therefore, the conclusion must be that a general scrappage scheme would bring marginal benefits at very significant cost.

Which leaves the question of whether, and indeed how, a targeted scheme could be introduced. In theory, such a scheme has great attractions. In practice it would be extremely difficult to draft and administer for reasons which include, but are not limited to:

1. A lack of information on: where vehicles are used (rather than where they are registered); how much vehicles are used in areas where air quality is a particular problem; and what time of day vehicles are used in areas where air quality is a particular problem.
2. The fact that the dirtiest diesels (traditionally seen as those falling into Euro standards 1-5, but also [recently shown to include Euro 6](#)) are owned – though not necessarily extensively used by - low-income households who will be least able to afford to upgrade to a new zero-emission vehicle even with a publicly-funded financial incentive.
3. The cost and limited availability of other forms of transport. In London, the underground is already often at or beyond its design capacity. Outside of London bus services are not a reliable substitute. Car clubs are still a nascent concept.

All these issues might be addressed: those in point one by increased monitoring of car use by ANPR cameras or other tracking devices; and those in point two by means testing families to potentially provide the least well off with greater financial stimuli. The political and economic costs involved in both of these solutions are obvious. As for point three, no one would argue with the need for alternative forms of transport, but again there is a significant cost – one which no government has yet been prepared to meet – in establishing adequate provision.

TfL has put forward a scrappage proposal to Government which contains the costs it considers to be involved in its vision of a diesel scrappage scheme for London, as part of a larger national scheme. This proposal also identifies taxis and vans as worth targeting, but the plan falls short by not adequately recognizing that the air quality problem is not a dirty vehicle numbers issue, but a dirty vehicle mileage issue. Without TfL considering each of the steps laid out in this paper, to ensure the high mileage dirty vehicles are targeted for scrappage, the Mayor of London will struggle to convince an already sceptical and cash-strapped Government that it is getting a good return on its investment. At any time, but particularly now, £515 million is not an insignificant sum of money – and that's just the price quoted for London. TfL has suggested that the automotive industry might contribute financially to a scrappage scheme – as it did in 2009/10 – however the trade body, the SMMT, [has been lukewarm](#) on any involvement.

It is therefore hard to see how a scrappage scheme targeted at privately-owned dirty diesels can be made to work.

A better approach could be to target a scrappage scheme at public vehicle fleets where data on use, mileage and hence environmental damage is far easier to come by. In the absence of any sort of

scrappage scheme then the damage caused by diesels is likely to be tackled in a patchwork series of local initiatives, probably restrictions on vehicle use. This shifts the cost burden away from the public purse and onto private and commercial vehicle owners. This is broadly in line with the principle of the polluter pays, however it comes at the risk of penalising people for a buying decision which was made in good faith and is in part likely to have been predicated on the lower level of CO₂ emissions diesel engines produce when compared on a like-for-like basis with petrol engines.

Ultimately, if there are several hundred million pounds of taxpayers' funds available to help solve air pollution then this should continue to be used to promote the general take up of ultra-low emission vehicles, either through more spending on charging and fueling infrastructure or direct plug-in vehicle grants. It should not currently be used to fund a scrappage scheme aimed at private owners of diesels.

RAC Foundation
1 March 2017