

## Diesel passenger cars in the Netherlands: a summary

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### The price of diesel

The Dutch government discourages the purchase and use of diesel vehicles more than most European countries. The diesel vehicle fraction of the purchases is low, between 20% and 30%, and the retention of diesel vehicles in the Netherlands is also low. The percentage of diesel vehicles in the total fleet is currently about 16%. On the other hand, their contribution to the total distance and emissions is higher than can be expected on that basis, as the annual mileage of diesel vehicles is much higher than that of a petrol car. Diesel vehicles are used mainly as company cars with high mileages of around 30,000 km per annum. The total cost of operation of a diesel vehicle compared to a petrol vehicle is more tipped towards the annual cost with lower fuel cost.

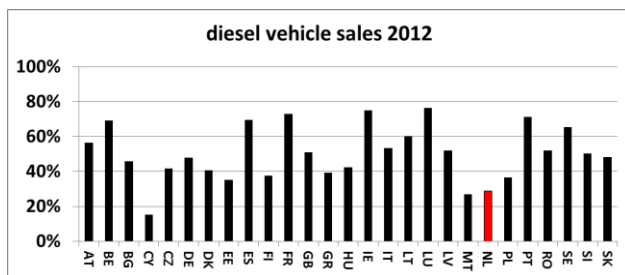


Figure 1 The percentage diesel vehicle fraction of new purchases of 2012 in EU-27. The Netherlands has a low percentage of diesel purchases, typically ranging from 25% to 30%. [EEA]

### Influx of vehicles

The influx of vehicles is for a greater part through company cars, which are typically the first four years of a car's lifetime. Therefore, policies which affect the sales of new cars, as company cars, largely affect the average vehicle fleet for the years after. The road tax and income tax related to the use of a company car have been based on the type-approval CO<sub>2</sub> emission, hence the fuel efficiency, of cars. This has led to the rapid introduction of fuel-efficient cars in the Netherlands since 2006. Consequently, one could expect that these vehicles are retained in the Netherlands. This is partly true: petrol cars remain in the Netherlands. For novel fuel-efficient technologies like hybrid on petrol fuel and electric vehicles, the trend of petrol vehicles does not apply, despite the more favorable Dutch road tax compared to diesel vehicles. The price of these vehicles, combined with their apparent popularity abroad, results in a large export of hybrid and electric cars. As the mechanism of export is expected to be different, the export figures are similar to those of diesel vehicles.

Due to the prevailing tax system the total cost of ownership of diesel cars yields them to be economically viable above an annual mileage of about 20,000 km, which typically applies only to new cars. The excise on diesel is lower than on petrol, which is compensated by a higher purchase tax (BPM) and road tax. Hence the cost per year is higher for a diesel vehicle, yet the cost per kilometer is lower. The additional 3 Euro cent excise on diesel introduced on 1 January 2014, i.e. the excise of diesel increased from 44 Euro cent per liter to 47.8 Euro cent, seems to generate some cross-border fueling as originally diesel fuel was more expensive in Germany. On the other hand, the excise on petrol is 76 Euro cent per liter.

The 28 Euro cent difference on excise translates for a petrol car into about 4,000 Euro additional cost over its lifetime, at a total mileage of 200,000 km. On the other hand, the additional purchase tax of a diesel vehicle with 120 g/km CO<sub>2</sub> is 3,650 Euro above the petrol vehicle purchase tax. Hence, the compensation for the lower fuel excise is more or less evenly divided between purchase and road taxes, over a lifetime of nine years. A refund on this purchase tax (e.g. 7,000 Euro: 3,500 Euro generally and 3,500 Euro extra for diesel for a 120 g/km vehicle. For a less fuel efficient vehicle these taxes increase rapidly) seems to be one of the reasons for the growing export of young cars since 2009.

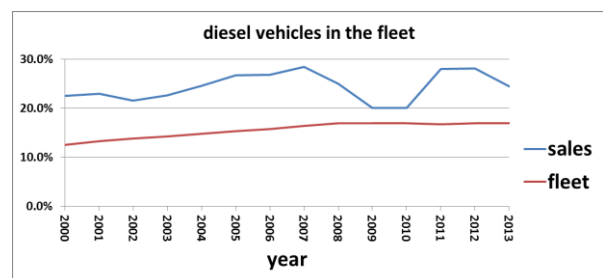


Figure 2 The diesel vehicles as fraction of the total purchases of about 500,000 vehicles per year, and as fraction of the total vehicle fleet of about 8 million vehicles.

### Car ownership and usage

The use of passenger cars in the Netherlands can be divided in two parts: business use and private use. The groups of vehicles are more and more separate: In business use the vehicle is new, drives more, and quite often is a diesel-fuelled car. The privately owned car is older, drives less, and usually uses petrol. Hybrid cars and plug-in hybrid cars are also mainly in business use

and follow the same trends in sales and export. Possibly, the price of a vehicle is the main indicator for its use. The vehicles in business use are exported early on, whereas privately-owned cars are imported to some extent. Consequently, the measures on purchases on vehicles have only limited effect on the total fleet, as vehicles newly sold in the Netherlands are not very likely to remain in the Netherlands for a long time. In particular, half of the diesel vehicles, hybrid vehicles, and electric vehicles have left the Netherlands before they are six years old, while an average petrol vehicle will typically be scrapped after sixteen years. This paper summarizes the import and export trends which seems to arise from the Dutch tax system. The changes in taxation have affected the export of mainly diesel vehicles.

The trends of import and export have been existing for a long time. However, since the introduction of the BPM (purchase tax) refund at export, for vehicles built after October 10<sup>th</sup> 2006, the export of vehicles at a young age has increased to 50% for diesel and 25% for petrol. Consequently, measures to reduce either the pollutant or GHG emissions of the Dutch fleet are limited tenable, due to this substantial export. In particular highly subsidized expensive technology, typically used in business-use vehicles, leave the country at a rapid rate. With a purchases of diesel vehicles around the 25%-30%, one would expect that of the 8 million cars, 2 to 2.3 million are diesel vehicles. Instead the number of diesel cars is about 1.5 million, which underlines the fact that many diesel cars are exported.

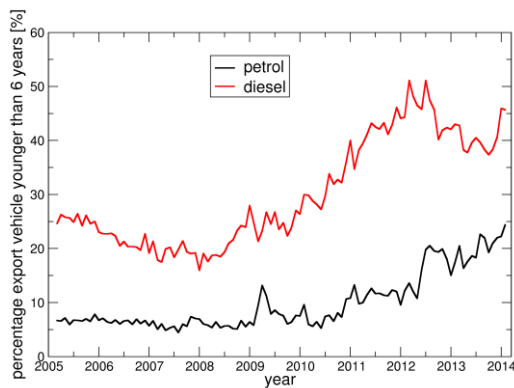


Figure 3 The percentages of vehicles exported before six years, over the time. The increase coincides with the introduction of purchase tax (BPM) refund at export for vehicles from 10 October 2006, of which export started three years later.

Furthermore, the measures that were taken in the Netherlands to stimulate an introduction of particulate filters (DPF) for diesel vehicles ahead of the Euro-5 legislation, in mainly 2007 and 2008, has been less effective as these vehicles have left the Netherlands in great numbers, and the imported diesel vehicles of the same age for private use have fewer filters than the vehicles that were exported. Moreover, these privately-owned diesel vehicles are typically not exported again. Therefore, the diesel vehicles from 2007 and 2008,

without filter, are now for a great extent imported vehicles. The diesel vehicles from that age with a (subsidized) filter, instead, that we originally sold in the Netherlands, are driving around abroad.

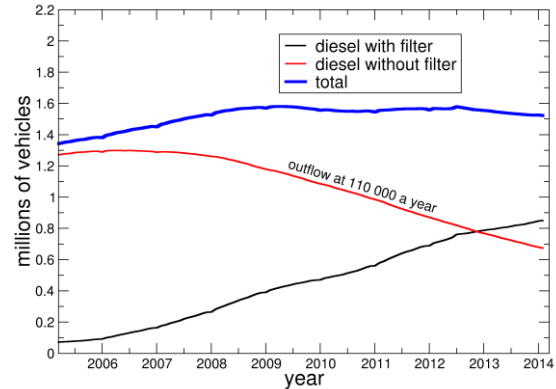


Figure 4 With the purchases in 2011-2012 of about 150,000 diesel vehicles with particulate filter a year, it is to be expected the outflow of diesel vehicles without filter is about the same. This is however not the case, because vehicles with filters are exported more often than the older vehicles without filter.

**Car as job benefit**

In the Netherlands a large number of people drive company cars. A company car is a job benefit with a limited income tax burden. Two-third of all new diesel cars are company cars, and about one-third of the new petrol cars are company cars. Consequently about one million cars of the eight million cars are company cars. Typically, the annual mileage of a company car is higher than that of a privately-owned car. Therefore, although business use contributes only 11% of the vehicle fleet in numbers, they contribute at least double that percentage of the total annual mileage.

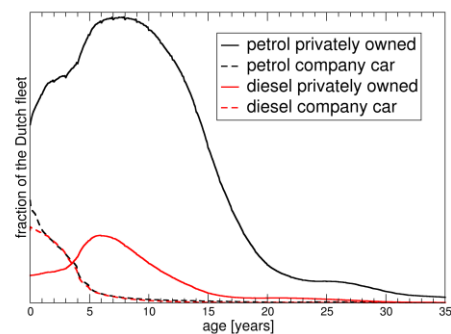


Figure 5 The composition of the Dutch passenger car fleet, split into diesel and petrol and ownership. Clearly, new vehicles are often company cars, which drops quickly for cars older than five years. Also, diesel vehicles drop from the fleet sooner than petrol cars.

The early departure of diesel cars from the Netherlands is mainly through export, especially in recent years. Only 15% of the diesel vehicles are scrapped in the Netherlands. The rest has left the country long before the scrapping age of about fifteen years. Petrol cars are

scrapped slightly later, as their annual mileage is much lower, for the reasons above. Consequently, scrapping of petrol cars occurs currently at 200,000 kilometers, while diesel cars are scrapped at 300,000 kilometers, yet at a slightly earlier age. See Figure 6.

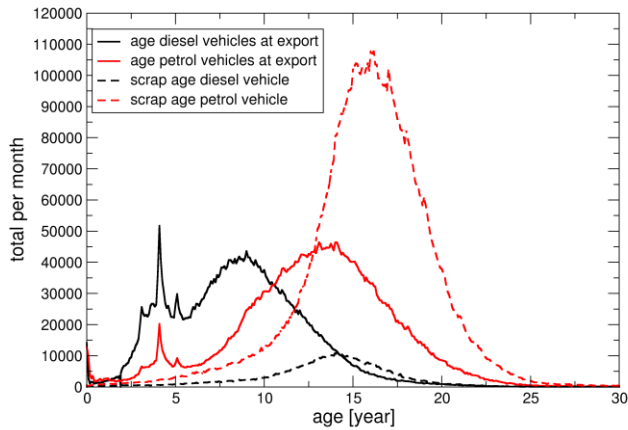


Figure 6 The age at export and the scrap age of petrol and diesel vehicles, averaged over the last nine years. Export is earlier than scrapping. A large number of petrol vehicles is scrapped, while diesel vehicles are mainly exported. The export peaks at three, four and five years have grown in recent years due to the purchase tax refund at export.

**Bottom line**

Diesel vehicles may have benefits for CO<sub>2</sub> emissions, due to the more fuel-efficient engine technology. However, the large gap in fuel consumption which traditionally existed between petrol and diesel vehicles has halved. Moreover, diesel vehicles are typically larger and heavier, not only with respect to their petrol counterpart, but also the market segment sales are skewed, such that the fuel efficiency of diesel engines are used for vehicle size and comfort rather than a lower overall fuel consumption.

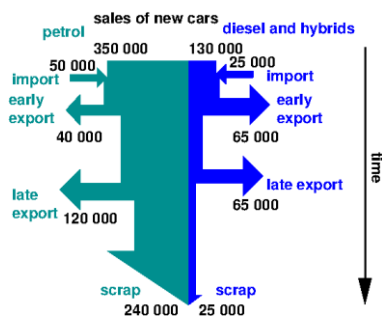


Figure 7 General trend over the recent years of new purchases, import, export, and scrapping.

Hybrid vehicles, in particular plug-in hybrids, seem also to make the same shift towards the business-end segment models. On the other hand, the pollutant emissions of diesel vehicles, i.e. mainly NO<sub>x</sub> emissions, remain high despite stricter regulation. Diesel passenger cars are significant contributors to the urban air-quality problem.

Hence, the export of diesel vehicles may be considered fortuitous in that respect. However, the large sums of public money involved in steering the purchases towards fuel-efficient vehicles may not be used most efficiently, when these vehicles, diesel and hybrids are exported at an early age.

**Acknowledgement**

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**Literature**

Norbert E. Ligterink and Rob F.A. Cuelenaere, *In- en uitstroom en samenstelling van het Nederlandse personenautopark*. TNO-rapport TNO 2014 R10643.