

Truck CO₂ – why market forces alone cannot deliver the goods

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A briefing by  TRANSPORT & ENVIRONMENT

Road freight CO₂ emissions are the fastest growing segment of land transport emissions, both at EU and at global level. ⁱ By 2030 heavy-duty vehicle emissions will account for almost 40% of road transport emissions. ⁱⁱ The European Commission is currently preparing a “decarbonisation of road transport strategy” in which it will outline its truck CO₂ plans.

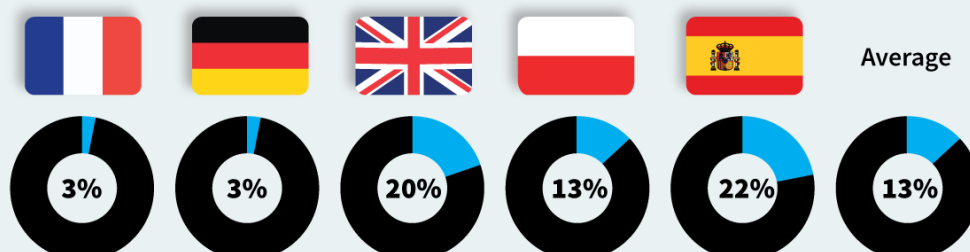
One key area of discussion is whether market forces alone can deliver sufficient CO₂ savings or whether additional regulatory intervention is needed. Truckmakers oppose regulation but others, including the German Environment Agency, the UK, France, Belgium, Romania Slovenia, the Netherlands and a number of other countries support truck fuel efficiency legislation. ⁱⁱⁱ

To contribute to this debate T&E commissioned a market study surveying 180 SME hauliers in France, Germany, Poland, the UK and Spain. In combination with the existing literature on market barriers in the freight sector, the survey results point to five key reasons why the market alone can't do the job, and why fuel efficiency standards are needed to strengthen market forces.

1. Inadequate supply of fuel-efficient vehicles and expensive options

Since the mid-1990s new truck fuel efficiency has barely improved. ^{iv} The difference in fuel economy between comparable new trucks is also relatively small (around 5%). This might explain why only 3% of German and French hauliers have ever changed brands to get better fuel efficiency – over the whole sample it was 12%. The fuel saving options that are available are often expensive, which can be related to a lack of volume or simple price setting policies. The main challenge is to make volumes and availability go up so cost and price can come down. Fuel-efficiency standards could achieve just that.

Hauliers that change brands to get better fuel efficiency



2. Price fixing and cartel behaviour by truck manufacturers

The European Commission has alleged that the five big truckmakers “*agreed the timing and price increase levels for the introduction of new emission technologies*” between 1997 and 2011. The ongoing cartel investigation points to truckmakers abusing their excessive market power to the detriment of their customers and the environment. This [was also apparent](#) during the recent review of the truck weights and dimensions directive where OEMs opposed voluntary changes that would enable new truck designs.

3. The structure of the haulage market

85% of haulage companies are small companies with one to 10 trucks. These SMEs have limited capacity to monitor, compare and improve fuel efficiency. The road freight sector is also a sector with very small margins and access to finance is a real problem. This discourages additional, ‘unnecessary’ or ‘risky’ investments, especially over longer periods and especially if these options are expensively priced.

4. Split incentives

The fragmented nature of the haulage market leads to split incentives. One example is the fact that trailers which are responsible for a large share of fuel consumption are often towed and owned by different companies. Why would a trucking company invest in aerodynamic trailer add-ons if he doesn’t own the trailer and why would a retailer invest if he won’t benefit from it?

5. Lack of information on (aftermarket) fuel saving technologies

In its 2014 truck CO₂ strategy the Commission identified a lack of independent fuel economy information as a key market barrier. However, the Commission’s own studies show truck buyers are well aware of the performance of new vehicles and technologies to reduce fuel burn. Where independent information would make the biggest difference is in certifying aftermarket or retrofit technology such as aerodynamic devices.

What should the EU should do?

The stagnation of truck fuel economy since the mid-1990s shows there is a limit to what the market alone can achieve. This limit was achieved long ago. Better information is a good thing but in a fragmented market where fuel economy differences are small and truckmakers abuse their enormous market power, putting a fuel economy sticker on new trucks will not make the difference. The Commission should therefore do three things:

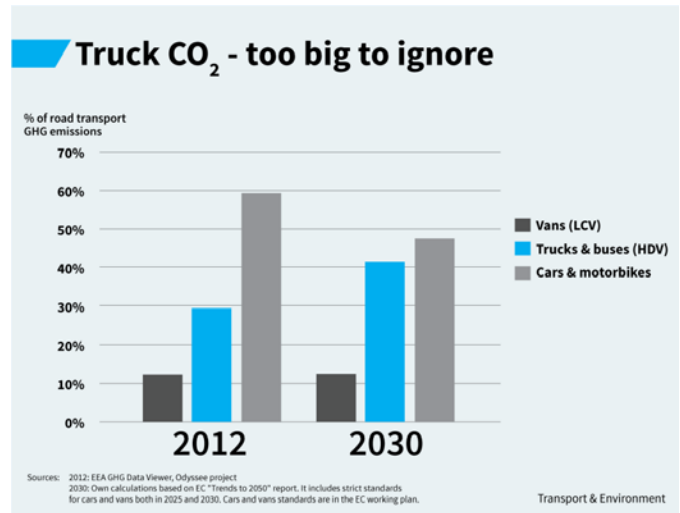
First, it should commit to truck fuel-efficiency legislation and lay out a timeline for their introduction in its 2016 decarbonisation of road transport strategy.

Secondly, the Commission should amend the road charging directive to enable km-charges that are differentiated according to CO₂/fuel efficiency.

Thirdly, the Commission should develop simple testing protocols to accredit the performance of aftermarket or retrofit technologies.

1. Introduction

In Europe, CO₂ emissions from trucks grew by 36% between 1990 and 2010. The increase is linked to the increase of goods transport by road but also to slow or no progress of truck fuel efficiency from the mid-1990s onwards. Historical data on truck fuel consumption is patchy but all available datasets^v (including the ones used by ACEA^{vi}) confirm that little progress was achieved over the last 20 years. This is despite the fact that there is a potential of at least 35% to cost-effectively improve truck fuel efficiency.^{vii} Fuel accounts for a 20-30% of truck operating costs^{viii}. However, this has not prevent truck CO₂ emissions from increasing significantly or truck fuel consumption from stagnating. It is sometimes argued^{ix} that the slow progress is a temporary phenomenon that should be ascribed to truckmakers' focusing on compliance with the EURO standards. But there are also strong indications that EU truckmakers were involved in a price fixing cartel and that there are market barriers that slow down fuel efficiency improvements.



GIPA market survey - key findings

- Fuel efficiency does not determine buying choices.**

Only **12%** of the SME hauliers surveyed have ever changed truck brands to get better fuel efficiency.
- Hauliers are very loyal to truck brands.**

For **62%** of respondents, the last truck they bought was the same brand as the vehicle they had before.
- Hauliers don't trust manufacturers fuel economy claims...**

Only **16%** of SME hauliers feel truckmakers' fuel economy claims are trustworthy and **43%** of them feel truckmakers exaggerate truck fuel economy claims.
- ...but are very sceptical about VECTO, too.**

Only **27%** would base purchasing decisions on the European VECTO tool although **60%** say additional real world testing would increase their confidence in the tool.

Truck manufacturers argue the situation has changed and that with the help of the newly developed VECTO test procedure, they can once again be *trusted* to deliver fuel and CO₂ savings. This briefing assesses these claims and analyses the market's ability to end and reverse the growth of truck CO₂ without regulatory intervention. The briefing includes the results of a market survey conducted by GIPA in 2014.^x

2. GIPA market survey – key findings

In May 2015, GIPA, a French market survey consultancy specialized in logistics and haulage, surveyed 180 SME hauliers about their buying behaviour. The interviewees are small SME hauliers (85% of the market)^{xi} in Poland, Spain, UK, Germany and France with on average 4.2 trucks and are active mostly in long haul and regional operations (60% of truck CO₂)^{xii}. The key outcomes of the survey are shown in the above graph and discussed in section 3.

3. Explaining the survey results – supply side barriers?

At first sight some of the GIPA survey results seem to run counter to popular wisdom on trucking. Indeed, the haulage market is usually seen as rational and fuel efficiency is considered to be a top priority for hauliers. However, on closer inspection the survey results point to one clear conclusion. Indeed, there is no contradiction between hauliers' real focus on fuel economy and the limited importance it has when buying vehicles. The survey points to barriers - first and foremost at the supply side - that are too high to be overcome by market forces alone. In section 4 we will discuss the key market barriers. We will also assess the impact of introducing VECTO/the MRV in section 5.

The problems on the supply side can be divided into 3 main categories: limited differences between new vehicles, expensive options and truckmaker and cartel behaviour.

3.1 Fuel economy is not what determines buying choices

Tests by magazines show the difference between comparable models is usually less than 5%^{xiii,xiv} While this is not insignificant for a high mileage (>100,000km/year) vehicle, it won't be the single decisive factor when buying a lorry, especially since tests only provide an average value which could play out very differently on the haulier's specific duty cycle (e.g. depending on the terrain). According to the UK Freight Transport Association "**Price, reliability and after sales service are just as important**" as fuel efficiency.^{xv} A survey by German transport magazine Verkehrsrundschau came to a similar conclusion in 2010: **fuel efficiency is not a key purchase criterion for German hauliers.**^{xvi}

	 DAF XF460 Super Space Cab	 MAN TGX 18.480 XXL	 Mercedes Actros 1845 LS Gigaspace	 Scania R450 LA Topline	 Volvo FH 460 Globetrotter XL
Fuel used/100km	36.76l/100km	37.03l/100km	35.39l/100km	36.05l/100km	37.15l/100km
Price	€103,000	€105,000	€110,000	€108,000	€108,000
					

Lastauto Omnibus, Euro-6-Zugmaschinen im Vergleich, 15/01/2014⁴⁸

Lastauto Omnibus, EURO 6 Zugmaschinen im Vergleich (2014)^{xvii}

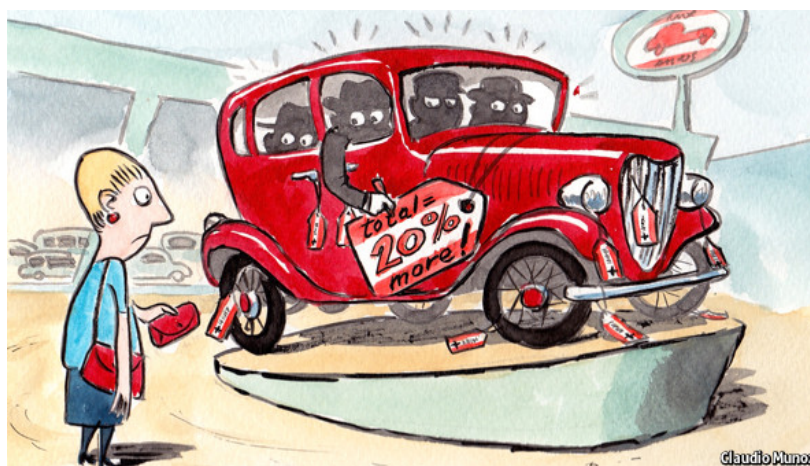
This explains why almost 9 out of 10 surveyed hauliers have never changed brands to get better fuel economy. It also explains why hauliers theoretical focus on fuel efficiency – as for example described by CE Delft 2012^{xviii}, plays a small role when actually buying a truck. The market reality seems to be that when they compare new vehicles, the limited differences in fuel efficiency don't outweigh things like reliability, price, brand loyalty or repair, finance and service conditions.^{xix}

The key issue appears to be a **lack of supply of attractively priced, fuel efficient trucks**. Here, it is important to note that the limited difference in truck fuel economy is not related to trucks having reached their optimum fuel efficiency. Indeed, a number of European and American studies demonstrates there are ample opportunities (around 35%) to improve EU lorry fuel economy in a way that reduces truck operators cost of ownership.^{xx}

3.2 Cartel behaviour by OEMs undermines effective competition

The European truck manufacturing market is dominated by three big players – Daimler, Volvo-Renault and Scania-MAN (Volkswagen) – and two smaller ones – DAF and IVECO. There is virtually no American or Asian competition. The European Commission has charged all major European truckmakers for being engaged in price fixing and collusion. Truck makers stand accused of having “*agreed the timing and price increase levels for the introduction of new emission technologies*” between 1997 and 2011”.^{xxii} Truckmakers’ uncompetitive behaviour was also [apparent during the review of the truck weights and dimensions directive](#).

Truckmakers successfully lobbied for a ban on voluntary changes to truck designs until 2022 because they were fearful of what might happen if one company would be able to produce a new design earlier than others. Instead of allowing innovation and competition, truckmakers focused on ensuring no-one would be in a position to distinguish themselves.^{xxiii}



The Economist 29/03/2014^{xxi}

3.3 Hauliers depend on expensive options

Many fuel-saving technologies, such as cab spoilers, low resistance tires or retarders, are not standard on new trucks and have to be purchased as an option, so at a higher price (price does NOT equal cost).^{xxiv} For example, a roof spoiler – essentially a metal plate guiding the air – can cost more than €1,500. Economy or eco-packs on offer are often listed at more than €10,000.^{xxv} These prices can only be partly attributed to additional manufacturing costs – the roof spoiler is a case in point - which suggests margins on fuel-efficiency technologies are high. Given that many small hauliers have difficult access to finance, many fuel saving options are therefore too expensively priced for mass market take up. A policy that would increase the sales volume of such technologies would also reduce their cost. If OEMs are obliged to sell more fuel efficient vehicles they'll be forced to also reduce price. In other words, hauliers would get more fuel savings for less money.

4. Demand side market barriers

The GIPA survey confirms the existence of a number of supply-side market barriers. However, some important hurdles also exist on the demand side. The most important ones relate to risk aversion, the market power of OEMs and their dealers and a lack of credible fuel economy information.

4.1 Risk aversion, access to finance and payback periods

85% of haulage companies are small companies with one to 10 trucks.^{xxvi} These SMEs have less capacity to monitor, compare and improve fuel efficiency than bigger companies. The road freight sector is also a sector with very small margins^{xxvii} and access to finance is a problem.^{xxviii} These factors discourage additional, ‘unnecessary’ or ‘risky’ investments, especially over longer periods.^{xxix} So while the first period of ownership for a truck is around five years, the payback periods for fuel-saving investments are much shorter – around 12-18 months. This explains why hauliers focus on “low risk, high yield” improvements such as driver training and monitoring (telematics).^{xxx}

4.2 Hauliers are loyal to brands and reliant on dealers

For 62% of respondents, the last truck they bought was the same brand as the vehicle they had before. This suggests brand loyalty is at least as high as in the passenger car market. Fleet managers also have limited access to independent, online, sources to compare trucks. Less than 20% SME hauliers use the internet to compare prices, fuel economy and options and buying a truck online is not possible. In fact, most of this information is simply not available for new trucks. In sharp contrast to this, the internet has revolutionised car buying by drastically reducing consumers’ dependence on dealerships.^{xxxi}

4.3 Hauliers lack independent information on (aftermarket) fuel saving technologies

In its 2014 truck CO₂ strategy the Commission identified lack of adequate information about fuel economy potentials as a key market barrier. The Commission’s VECTO simulation tool’s key aim is to provide more reliable fuel economy information to hauliers by sticking a fuel economy figure on all new trucks. However, its importance may well be overstated, at least when it comes to the tractor. A 2014 CE Delft study found that most fleet managers – i.e. of bigger haulage fleets – are relatively well aware of different solutions to reduce fuel consumption.^{xxxii} Good information can also be found in professional magazines that undertake testing and some of the bigger companies perform their own testing. This situation may be different for SME hauliers who generally have less capacity to ‘manage their fleets’. Where better information might make a bigger difference is for aftermarket technologies. In the UK the Department for Transport is sponsoring a project to develop an independent test procedure to verify aftermarket technologies (tires and aerodynamics). This is similar to what was developed in the US as part of the Smartway partnership.^{xxxiii}

4.4 Split incentives

When a haulier reduces his fuel consumption, who benefits from this? The obvious answer would be the haulier since his costs would go down and so he’d have a better margin. But what if fuel costs/savings are passed on? In the US most studies mention this as one of the key factors limiting the effectiveness of market forces. Indeed, if the cost of fuel is fully passed on to the “buyer” of the freight service it would actually be up to them to encourage truckers to improve their efficiency. Research by CE Delft – based on a small and unrepresentative sample - suggests that in Europe contracts where fuel costs are fully passed are rare but this is an issue that merits further research.

But the study does highlight another very important split incentive: trailer ownership. Whilst hauliers often own their tractor, this is not the case for trailers. Supermarkets can for example own trailers and at the same time outsource the actual towing of the trailers to hauliers. In this case there clearly is a split incentive since the haulier is unlikely to invest in a trailer that he/she doesn’t own whilst a retailer may not invest in it because he/she doesn’t benefit from the savings. Trailer aerodynamics, rolling resistance, weight etc. play a very big role in truck fuel efficiency and generally it is assumed that a lot of the cheapest fuel savings relate can be achieved on trailers.

5 Does testing and monitoring truck CO₂ emissions help overcoming market barriers?

Whether or the EU truck CO₂ (VECTO) test procedure helps overcoming the aforementioned market barriers is an important consideration in the on-going discussion on truck CO₂ legislation. It is clear from the below

discussion of the different barriers that sticking a fuel economy sticker on trucks will not make a meaningful difference in overcoming market barriers.

1. The GIPA survey confirms **fuel economy is not the primary consideration** when buying a new truck. Given that differences in fuel economy are limited, all VECTO would do is certify relatively small differences. The MRV is therefore very unlikely change buying behaviour.
2. An MRV will do nothing to stop **cartel behaviour** from occurring. It will also do very little to stimulate competition between the truckmakers (see 3).
3. **Brands loyalty and dealer dependence** will not change because of VECTO. In theory VECTO could enable simpler comparisons between trucks but if the differences are small and fuel economy is not the primary concern when buying a truck, VECTO won't make a difference.
4. An MRV can only very indirectly influence **supply of fuel saving technologies**, in particular since VECTO is focused on new vehicles and not aftermarket technologies. More reliable fuel consumption information may increase hauliers' trust in fuel saving technologies that quickly pay back but will not reduce the price of these technologies.
5. **Demand side barriers** such as risk aversion and split incentives will not be affected by the introduction of a CO₂ test procedure for trucks.

Conclusion

Truck fuel economy has been largely stagnant since the mid-1990s. Meanwhile EU truck CO₂ emissions continued to increase (+36% by 2010). There is a cost-effective potential of around 35% but also a clear limit to what market forces alone can achieve.

Increasing market transparency and providing more or less reliable fuel economy figures to hauliers is positive. However, the VECTO simulation tool will not significantly accelerate the pace of fuel economy improvements or indeed lead to overall truck CO₂ emission reductions. Hauliers distrust the VECTO tool. And while this can be solved, VECTO does not have a real impact on the other more important barriers like limited supply, pricey options or difficult access to finance.

Fuel efficiency standards would help overcome these barriers. They would oblige truckmakers to focus their R&D efforts on improving fuel economy and ensure new technologies are fitted as standard and prices would fall – although the Commission should take care to empower hauliers and prevent cartel practices. The economic impacts of standards would be positive. Hauliers would make more fuel savings – up to €10,000 per year – for less money. This would boost the economy, create jobs and reduce Europe's dependence on imported oil. Finally, set at adequate levels, standards would reduce road freight CO₂ emissions and help member states achieve the 2030 climate goals. The Commission should also amend the road charging directive to enable charges that are differentiated according to CO₂/energy efficiency. There are currently no fiscal instruments to incentivise more efficient vehicles; CO₂-based tolls, especially when introduced in a number of central European countries (for example, in Germany and Austria) could have a major impact. Finally, the Commission should end the lorry cartel and prevent it from reappearing. One thing the Commission could do immediately is to open up its VECTO test procedure to hauliers and fleets as they have asked for since July 2014. This would empower hauliers and could increase competition. Bringing forward the date where new truck designs are allowed would also stimulate competition.

Further information

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Endnotes

- ⁱ ITF, Transport Outlook 2015.
- ⁱⁱ T&E, too big to ignore (briefing), 2015 or ICCT market analysis (see endnote 3)
- ⁱⁱⁱ During the April information Environment Council France, Romania, Denmark, Sweden, Belgium, Austria, Luxemburg and Finland mentioned the need to set CO2 targets for **all** vehicles, including HDV. Slovenia and the UK had previously spoken out in favour. <http://www.euractiv.com/section/transport/news/five-eu-countries-call-for-limits-on-truck-co2-emissions/>
- ^{iv} http://www.theicct.org/sites/default/files/publications/ICCT_EU-HDV_mkt-analysis_201512.pdf
- ^v European Commission, Strategy for reducing heavy-duty vehicles' fuel consumption and CO2 emissions, 2014. http://ec.europa.eu/clima/policies/transport/vehicles/heavy/docs/com_285_2014_en.pdf; [UK Department for Transport data series](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/271424/UK_Dept_for_Transport_data_series.pdf)
- ^{vi} ACEA 2010 http://www.acea.be/uploads/publications/20101013_Commercial_Vehicles_CO2.pdf
- ^{vii} http://ec.europa.eu/clima/policies/transport/vehicles/heavy/docs/hdv_2012_co2_abatement_cost_curves_en.pdf
- ^{viii} Depending on country, diesel price, cost of labour, type of operations, etc. Typically long haul operations have the highest share of fuel costs although typically these vehicles also fill up where it's cheapest (e.g. Luxemburg). In France it's currently 22%, in the UK 33% for long haul operations. All other operations (urban, regional) have lower shares. <http://www.cnr.fr/Indices-Statistiques/Longue-distance-40T#haut>
http://www.fta.co.uk/policy_and_compliance/fuel_prices_and_economy/fuel_prices/fuel_fractions.html
- ^{ix} For example in the EC strategy it is assumed annual fuel economy improvement will pick up from no progress to 1% again now there are no new EURO standards on the horizon.
- ^x GIPA, Market survey on fleet managers' purchase behaviour, 2015. <https://www.transportenvironment.org/publications/truck-co2-%E2%80%93-why-market-forces-alone-cannot-deliver-goods>
- ^{xi} AEA-Ricardo LOT 1, p. iv
- ^{xii} Ibidem, p181.
- ^{xiii} According to the experienced truck testing magazine Lastauto Omnibus: <http://www.eurotransport.de/test/1000-punkte-test-euro-6-zugmaschinen-im-vergleich-6529107.html>
- ^{xiv} Difference between best and worst lorry in this test ca. 1l/100km <http://www.verkehrsrundschau.de/erster-vergleich-von-euro-6-lkw-1287692.html> or 1.5l/100km. http://www.eurotransport.de/test/1/9/6/9/0/1/6/Daten_und_Messwerte_im_Vergleich_.pdf
- ^{xv} P12. http://www.fta.co.uk/export/sites/fta/galleries/downloads/logistics_carbon_reduction_scheme/lcrs_supp-sept_2015.pdf
- ^{xvi} <http://www.verkehrsrundschau.de/studie-zum-lkw-einkauf-kraftstoffverbrauch-nicht-mehr-so-wichtig-950617.html>
- ^{xvii} <http://www.eurotransport.de/test/1000-punkte-test-euro-6-zugmaschinen-im-vergleich-6529107.html>
- ^{xviii} CE Delft, Market barriers to increased efficiency in the European on-road freight sector, 2012.
- ^{xix} Ricardo-AEA, Opportunities to overcome the barriers to uptake of low emission technologies for each commercial vehicle duty cycle, 2012 p7.
- ^{xx} CE Delft, marginal abatement costs for Heavy Duty Vehicles (2012) http://ec.europa.eu/clima/policies/transport/vehicles/heavy/docs/hdv_2012_co2_abatement_cost_curves_en.pdf;
Or for a more recent US perspective: carbon war room <http://www.truckingefficiency.org/>
- ^{xxi} <http://www.economist.com/news/business/21599799-trustbusters-have-got-better-detecting-cartels-and-bolder-punishing-them-incentives>
- ^{xxii} Financial Times, Top truckmakers operated cartel for 14 years, says EU, 23/12/2014. <http://www.ft.com/intl/cms/s/0/da53eb98-8073-11e4-872b-00144feabdc0.html#axzz3kOSSjeTW>
- ^{xxiii} Financial Times, France and Sweden close to victory over EU lorry designs, 14/03/2014. <http://www.ft.com/intl/cms/s/0/602a0b1c-db5b-11e3-94ad-00144feabdc0.html#axzz3kOSSjeTW>
- ^{xxiv} CE Delft, Market barriers (2012)
- ^{xxv} Verkehrsrundschau tests of Mercedes Actros 1863 and the Scania R 520 <http://www.verkehrsrundschau.de/testdatenbank-1025495.html>
- ^{xxvi} AEA-Ricardo, *Reduction and Testing of Greenhouse Gas (GHG) Emissions from Heavy Duty Vehicles – Lot 1*: report, pIV.
- ^{xxvii} <https://www.pwc.co.uk/transport-logistics/assets/lr14-report-web-060514.pdf>
- ^{xxviii} Ricardo-AEA, Opportunities to overcome the barriers to uptake of low emission technologies, 2012 p26.
- ^{xxix} CE Delft: "For example, in some countries limited access to financial instruments makes it hard to finance fleet modernisation."
- ^{xxx} Ricardo-AEA, 2012.
- ^{xxxi} http://www.jdpower.com/sites/default/files/14_July_rebirth_of_a_salesman_Final.pdf
- ^{xxxii} CE Delft, *Market barriers* p47.
- ^{xxxiii} <https://www3.epa.gov/smartway/forpartners/technology.htm>