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Fuel efficient vans would be cheaper to buy and run

A briefing on the report "Potential CO_2 reduction from optimal engine sizing for light commercial vehicles" by TNO / CE Delft on behalf of Transport & Environment, with recommendations for policymakers.

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1. Introduction: optimal engine sizing

In October 2009, the European Commission proposed the introduction of legally-binding CO_2 standards for light commercial vehicles (vans) following similar legislation for cars adopted in December 2008. It is part of the EU's efforts to cut CO_2 emissions, reduce oil dependence, and cut fuel bills for companies.

The debate on this legislation and the underlying studies, including the Commission's impact assessment are biased, in the sense that they only look at advanced technologies as a way to cut emissions and to save fuel. More advanced technologies cost time and money to develop.

For that reason, Transport & Environment asked TNO and CE Delft to investigate a forgotten, but quick and cheap way to reduce fuel use and CO_2 emissions, namely '*optimal engine sizing*'[1]. This missing link in the debate means offering vans with smaller and less powerful engines. It does not require vehicle redesign, can be offered quickly and would make vans cheaper to buy and more efficient to run.

TNO looked at the impact on fuel costs and other elements of total cost of ownership (TCO), if vans were to return to the on average 13% lower engine power levels of 1997.

'Optimal engine sizing', a term coined in the TNO report, implies combining 13% lower power output with further engine downsizing enabled by today's technologies. The result of these two technological shifts is that performance levels of 1997 would be achievable with 31% smaller engines than in 1997, using technologies widely available today.

2. Demand for vans with lower power and smaller engines exists

Over the last few decades there has been a continuous trend of increased engine power in vans, in parallel to a similar trend in passenger cars. In the market for new vans, this trend is particularly odd. The maximum weight vans are allowed to carry has not increased, neither have speed limits. Despite this, the significant improvements in engine efficiency that have been achieved have been channeled mostly into increased engine power, and not into fuel savings. That is irrational for a product serving a supposedly rational market driven by TCO considerations and tight margins.

The vans market is still less rational than often thought. The lower end of the van market, small vans, is car-derived and is hence subject to the same marketing trends that have increased the power of cars so much over the past decades. And when the lower segment is overpowered, it is, for marketing reasons, difficult for the higher segment not to follow that trend.

In cars, power is still used as a marketing tool. But this trend has begun to change since the adoption of CO_2 regulation: carmakers now also compete on fuel consumption and CO_2 emissions. This is notable in the array of 'eco' sub-brands that have appeared since CO_2 regulation was introduced. But in vans this shift has not materialized: van manufacturers do not want to be seen to offer lower-powered products than their competitors.

Despite this, there is clear consumer demand for lower-powered vans. It is particularly telling that the top selling van in four out of five of the categories TNO analysed for this study was the base engine model, suggesting that there is already a significant market for vans with power below the current base model. Looking ahead to when CO_2 legislation for vans has been adopted, competitive pressures will work towards lower CO_2 rather than more power. This is already the case with cars; manufacturers are offering cars with smaller engines and lower power to comply with CO_2 legislation in the cheapest way possible.

1 www.transportenvironment.org/Publications/prep_hand_out/lid/586

3. Optimal engine sizing alone could be enough to hit a 175 g/km target

The TNO study looked at the top selling vans in Europe and analysed the effect on fuel consumption and CO_2 emissions of reoptimising engines to match the equivalent engine power levels of 1997.

The study found that fuel consumption and CO_2 emissions could be cut by between 6 and 16% in this way if engines were made 13% less powerful and downsized by 31% respectively. That represents a lifetime fuel saving per van from €1,000 to almost €3,000. Business in Europe could save a total of €2-4 billion a year in fuel bills.

Note that the European Commission proposed a 175 g/km CO2 target for vans for 2016, down 14% from their 2007 level of 203 g/km.

This means that optimal engine sizing could, all by itself, be enough to meet the 175 g/km target, without the need for any additional technology. Clearly that means the long-term target of 135 g/km would be significantly easier to meet as a result.

4. Vans would be up to 10% cheaper, not more expensive

The European Commission's impact assessment, **which does not look at optimal engine sizing**, says compliance with the 175 g/km target would make vans €1,100 more expensive.

This study corrects that distorted picture. It shows that vans with smaller and less powerful engines do not only save fuel costs, they are also cheaper to buy. TNO concluded that vans with 13-31% smaller engines and 6-16% lower CO2 emissions could be 1-10%, typically €200-2,000, cheaper per van, instead of €1,100 more expensive.

This study shows how important and attractive optimal engine sizing is for a cost-conscious industry (and how big a mistake the Commission has made in the impact assessment).

5. Total cost of van ownership for business cut by up to 12%

European businesses currently spend roughly €70bn a year to keep vans running. This is the Total Cost of Ownership (TCO). TCO is a critical value indicator in the commercial vehicle market – it includes costs of purchase, fuel, insurance, tax, repairs etc.

The study shows that vans with smaller engines use less fuel, are cheaper to buy and to insure, and often fall in lower tax bands.

According to the report, vans equipped with reoptimised engines with power levels of 1997 can reduce TCO by 2 - 12%. This represents a saving of up to €5,000 over the lifetime of a typical van, or EU27-wide savings for business of up to €8bn per year.

6. Conclusions

The TNO study for T&E shows that 'optimal engine sizing', i.e. returning to engine power levels of 1997, can cut fuel costs and CO2 emissions by up to 16%, cut vehicle purchase costs by up to 10%, and cut total cost of ownership by up to 12%. Moreover, optimal engine sizing can be introduced quickly and in existing models.

The 175 g/km target proposed for 2016 could be met using optimal engine sizing alone, and at the same time make vans cheaper to buy instead of more expensive.

In addition the long-term target of 135 g/km would be significantly easier to meet.

The European Commission's impact assessment completely ignored this potential and is hence far too pessimistic about how far fuel consumption can be cut, at what speed, and at what cost.

7. Policy recommendations

The results of this study justify earlier and lower CO_2 standards for vans than the European Commission proposes. T&E's proposal is 160 g/km by 2015 and 125 g/km by 2020, as opposed to 175 g/km by 2016 and 135 g/km by 2020 proposed by the Commission.

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