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Position Paper

Stricter van fuel economy standards – the business case

Context

Fuel is an important and rising business cost. Operating a van typically costs around €2400 a year in diesel alone[1] – and fuel bills represent around a third of the total costs of ownership.[2] Vans are also one of the fastest growing sources of transport greenhouse gas (GHG) emissions, increasing by 26% between 1995 and 2010 and now accounting for 8% of road transport emissions.[3] Further growth is anticipated, in part from the more limited regulation of driving vans compared to trucks.

To counter the rising van CO_2 emissions a regulation (510/2011) was introduced in 2011, that requires van manufacturers to improve fuel economy and reduce emissions. However, weakening of the original Commission proposal (135g/km) led to the introduction of a target that only requires a 0.5% fuel economy improvement per year until 2017.

The European Commission recently completed its review of the proposed 2020 target recommending that the current target (147g/km) is retained.[4] This is despite evidence that the decision on 147 g/km was based upon information that significantly over-estimated both the costs of reducing emissions and actual level of CO_2 emissions from vans.

The vans target should be amended to be of equivalent stringency to that for cars

There are five strong reasons for more ambitious fuel economy standards for vans:

- Fuel efficient vans reduce costs for business users improving the competitiveness of European companies;
- The evidence on which the original decision was based was flawed;
- Tighter targets extend the market for low carbon technologies reducing costs, promoting innovation, creating jobs and developing export opportunities;
- Parity between targets for cars and vans would avoid potential "leakage" inadvertently weakening the cars target;
- Stop seven years of largely ineffective legislation, and offset increased emissions from a rapidly expanding vans market.

This briefing outlines the new evidence and demonstrates a compelling case to strengthen the vans target. It is largely based upon a study undertaken by consultants TNO.[5]

Fuel efficient vans reduce costs for business users improving the competitiveness of European companies

Annual fuels costs for a typical delivery van range from €1800 to €3000[6] per year depending upon the size and use of the van. Business users are primarily concerned about the total costs of ownership rather than just the purchase price, and any additional purchase price, resulting from applying CO_2 reducing technologies, will be offset by lower fuel bills. A typical new van buyer keeps the vehicle for about five years, so a payback within this period reduces overall costs of ownership.

The fuel efficiency of a van is directly related to its CO_2 emissions. The European Commission estimates that technological improvements applied to achieve the current 147 g/km target would increase the purchase price by just 2.5%[7] while improving the fuel economy by some 20%, relative to 2010 values. Fuel savings payback the investment in 1.5 years, but a more ambitious target would save businesses much more money.

Setting a target of 118 g/km (equivalent to the 95 g/km target for passenger cars)[I] would double annual fuel cost savings to around €825 per year (at current oil prices, excluding VAT). The payback period for a 118 g/km target would be less than three years – saving the first owner money. Better van fuel economy would also translate into better resale value further reducing the total costs of ownership. Table 1 illustrates the additional savings arising from more stringent van targets compared to 2010.

	Current Target	**Original European Commission proposal**	**Equivalent to cars 95 g/km**	**Equivalent to cars 80 g/km**
Average CO_2 emissions from vans 2020	147 g/km	135g/km	118 g/km	110 g/km
Absolute price increase	€ 605	€ 1,064	€ 2,000	€ 2,787
Relative price increase	3%	5%	10%	14%
Annual fuel savings (excl. VAT)	€ 440	€ 597	€ 825	€ 927
Payback period[II]	1.5 years	2.0 years	2.8 years	3.6 years
Lifetime fuel savings - vehicle life (13 years)	€ 3,478	€ 4,720	€ 6,521	€ 7,328

Table 1 – Business (end-user) benefits of different levels of stringency for the van CO_2 target in 2020[8]

The evidence on which the original decision was based was flawed

Based on recent insights in technology costs,[9] and taking account of changes in the vans market, it is now clear that the costs for complying with the vans regulation were significantly overestimated in 2010 when the regulation was agreed. The overestimation of costs was further enhanced by the fact that the average emissions of new vans in 2007, which was used as a reference year, were probably lower than was estimated previously.

The 147g/km target was based upon flawed information and industry scaremongering - a tighter target is cost-effective

[I] in terms of marginal reduction cost per gram of CO2
[II] The net present value of fuel cost savings is used to determine the payback period

The original study underpinning the Commissions impact assessment[10] estimated that the average cost of meeting a target of 175 g/km would result in an average retail price increase of between €1100 and €1700.[III] A subsequent study[11] estimated that for a target of 150 g/km in 2020 (similar to the 147g/km target that was finally agreed), would result in an average retail price increase by €1961 to €3045. Cost curves used in both studies were partly based on inputs on costs and reduction potentials of technologies obtained through industry consultation. A study by the German Ministry of Economy[12] estimated the cost to be between €5000 and €8800! Vehicle manufacturers, represented by ACEA, described the Commission proposal as "unrealistic", "undoable" and stated that achieving the long term target would be extremely expensive.[13] The German automotive federation (VDA) described the 147g/km target as "very difficult to accept, disproportionally expensive and generally harmful for the economy."[14] The most recent study for the European Commission,[15] estimates the retail price increase resulting from the cost for meeting 147 g/km in 2020 to be on average just €605 per vehicle.[IV]

The estimated average additional manufacturing costs for vans have fallen by between a factor of 4 and 17 since 2010!

The estimated average level of CO_2 emissions from vans is also much lower than forecast when the regulation was agreed in 2010. The original studies also estimated that average emissions were 203 g/km in 2007 and it was "assumed unlikely that many improvements would occur in the absence of regulatory incentives to manufacturers."[16] However, by 2010 emissions had fallen to just 181 g/km, a reduction of 22 g/km or 11% in 3 years. There are several contributing factors that caused van emissions to be much lower than previously estimated including an incomplete database of vans sales and emissions in 2007. The distribution of sales over different segments also appears to have shifted significantly between 2007 and 2010. This is shown in Table 2 and estimated to account for around 8g/km of the difference.

		Class I	Class II	Class III	Average
2007	% sales	18%	25%	57%	-
	Average CO_2 emissions	145.4	179.3	231.2	203.0
2010	% sales	21%	34%	45%	-
	Average CO_2 emissions	122.8	161.6	223.2	181.4

Table 2 - 2007 and 2010 sales distributions and CO_2 emissions per LCV class[17]

It has emerged that parts of the automotive industry and the German Government were aware that the Commission emission estimates for 2007 were too high. The study commissioned by the German ministry of economy[18] and published in 2010 assumes emissions around 181g/km.

A recent study for the European Commission provides strong indications that manufacturers are also likely to have increasingly utilised flexibilities in the test procedure to artificially lower test results, as has also been noted for cars. This includes declaring a value that is up to 4% lower than the measurement result.[19] There is also likely to have been some genuine reduction in van emissions resulting from the introduction of new technology, particularly in small Class 1 vans that are

[III] relative to 2007 vehicles
[IV] relative to 2010, this includes an 11% uplift from the additional manufacturing cost to account for manufacturers overheads and profits

derived from cars. But given the contribution of other influences only part of the measured improvement between 2007 and 2010 is due to genuinely better vehicle fuel efficiency.

The 2009 estimate of average van CO2 emissions was much higher than estimated today – the 147g/km target is therefore up to 10% weaker than expected."

Tighter targets increase the market for low carbon technologies; reducing costs, creating jobs and developing export opportunities

The current proposal could lead to a potential "technology graveyard" for vans as manufacturers reduce investment in and fail to deploy available technology. This is despite fuel efficient technologies for vans being effectively the same as those used in cars, as seen in Table 3. A target of 118g/km (equivalent to 95g/km for cars) would not require electric vehicles or hybrids but can be achieved through technologies such as downsized engines, lightweight materials, aerodynamics improvements, and reducing driveline friction.

	147 g/km			118 g/km			110 g/km		
	Class I	Class II	Class III	Class I	Class II	Class III	Class I	Class II	Class III
Mild downsizing	++	+	++	++	++	++	++	++	++
Medium downsizing	-	-	++	+/-	++	++	++	++	++
Micro hybrid	- -	-	+/-	+/-	++	++	++	++	++
Mild hybrid	- -	- -	- -	- -	- -	- -	- -	- -	- -
Full hybrid	- -	- -	- -	- -	- -	- -	- -	- -	- -
BIW lightweighting (mild)	- -	- -	- -	-	-	-	+	+	+
BIW lightweighting (medium)	- -	- -	- -	- -	- -	- -	- -	- -	- -
BIW lightweighting (strong)	- -	- -	- -	- -	- -	- -	- -	- -	- -
Aerodynamics improvement (minor)	++	+	++	++	++	++	++	++	++
Aerodynamics improvement (major)	++	+	+	++	++	++	++	++	++
Reduced driveline friction (mild)	+/-	++	++	+/-	++	++	++	++	++
Reduced driveline friction (high)	-	+	+	+	++	++	++	++	++

BIW=Body in white

Table 3 – Technologies likely to be deployed upon different levels of stringency of the 2020 light commercial vehicle CO_2 target[20]

A simple and very cost-effective way to improve fuel economy is optimizing the engine power of vans. After decades of increasing engine power, today many vans are overpowered. Overpowering increases the performance and speed of vans but does little to improve their utility (vans are mostly used for urban distribution). A 2010 study by TNO found engine power optimization could cut fuel consumption and CO2 emissions by between 6 and 16% at minimal cost.[21]

Another very cost-effective manner to cut fuel consumption and optimize engine power is the mandatory speed limiters. Vans are the only commercial vehicles that are not speed-limited. A 2010 study by CE Delft[22] found that a 100km/h speed limiter for vans would immediately reduce average fuel consumption and emissions by 6-7%. That same study finds that reducing the top speed of vans to 100km would result in a 46% reduction of casualties and a 37% reduction of severe injuries on motorways, saving about 200 lives and avoid thousands more to be badly injured every year.

Public support for capping vans' speed is overwhelming. Polls in Italy and Germany show that more than 80% of respondents are in favour of speed limiters. In Holland and the UK too, the majority of citizens would like vans to be speed-limited.[23]

Without a more ambitious 2020 target, the vans market risks becoming the "technology graveyard" of the automotive sector

To encourage the partial hybridisation and electrification of vans the EU would need to set targets that are significantly more ambitious than 110 g/km. A sub-100g/km target should be envisaged for 2025 equivalent in strength to the 60g/km T&E proposes for cars.

As seen in Figure 1, the average costs of technology to achieve more stringent targets have been estimated by TNO for a range of targets. Figure 2 indicates the payback time (or break-even period) of the additional investments as function of the target level and the oil price.

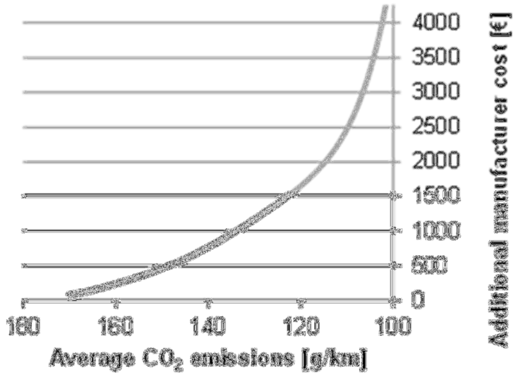

Figure 1 - Additional manufacturing costs and breakeven times for a range of targets

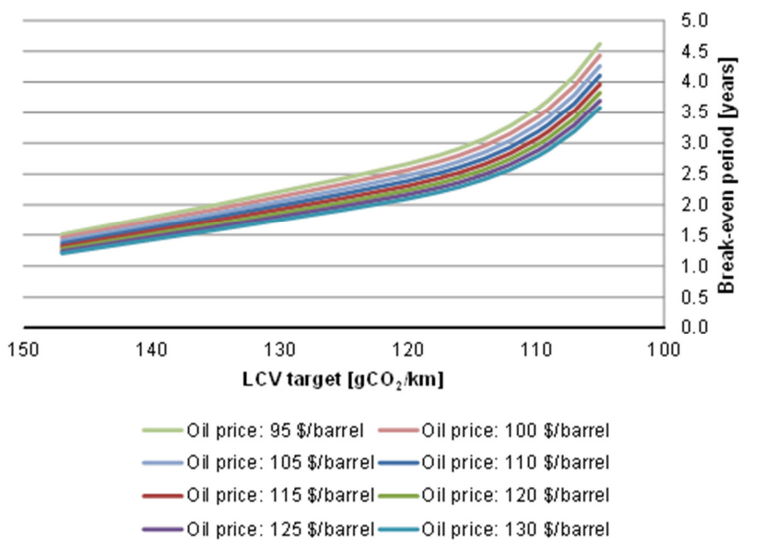

Figure 2 – Payback time of the additional vehicle costs associated with applying CO2 reducing technologies, as function of the target level and oil price[24]

Past experience suggests that the actual costs of technology will be at least a factor of two lower in practice than estimated in advance of the adoption of the regulation. This is since once manufacturers try to achieve the regulation they are able to find cheaper and more effective ways than originally predicted. Figure 2 illustrates that even the lowest oil price scenarios combined with the most ambitious targets (sub-110g/km) still achieve a payback period within the typical first ownership period of the van (approximately 5 years).

Equipment suppliers, who have developed technologies to meet CO_2 standards for passenger cars could increase sales of fuel efficient technologies through their use in vans. Automotive suppliers employ about four times as many employees as the vehicle manufacturers creating a positive impact on employment. Extending the market for fuel efficient technologies will help to reduce their costs and create jobs. There may also be benefits to van manufacturers since more fuel efficient models will provide new export opportunities.

Parity between targets for cars and vans will avoid weakening the cars target through "leakage"

In many EU countries it is possible for vehicles, which are type approved as vans (N1), to be registered and used as passenger cars (M1). For manufacturers that produce both passenger cars and vans the wide disparity between the ambition levels of the cars and vans regulations may provide an incentive to promote the sales of vans for use as passenger cars.

Shifting sales from cars to vans would reduce the net impact of the combination of the two different regulations.[25] The potential for this leakage might be limited by the recent adaptation of the definition of N1 vehicles, which no longer allows small N1 vehicles to have more than 1 row of seats[26] but does not entirely eliminate the risk. Estimates of the potential leakage are illustrated in Table 4 for a range of vehicles.

Vehicle model	2020 M1 CO2 target [g/km]	2020 N1 CO2 target [g/km]	M1 - N1 gap
Citroen Berlingo	102.2	133.7	31.5
Peugeot Partner	102.6	134.6	32.0
Renault Kangoo	100.0	129.1	29.1
VW Caddy	108.7	147.3	38.6
Fiat Doblo	96.8	122.3	25.5
Average	103.5	136.4	32.9

Table 4 – Gaps between the equivalent of the 95 g/km M1 target and the 147 g/km N1 target[27]

Such a shift results in lower manufacturer costs. For car derived vans with a mass around 1500 kg, the total cost benefit may be just over € 5100 per shifted vehicle[V]. Manufacturers could financially incentivise consumers to acquire N1 type approved vehicles (to be used as passenger cars). In case the full benefit is transferred to the consumer, the retail price may be lowered as much as € 6300. For this advantage, the consumer would have to accept the N1 characteristics of the vehicle, which could for instance mean only having two seats.

Table 4 shows that virtually identical vehicles would be subject to different regulations and emission targets. This is not only illogical but risks weakening the cars target. It could however be easily avoided by defining equivalent targets for cars and vans.

Conclusions and policy options

The market for vans is growing rapidly and with this emissions grew by 26% between 1995 and 2010 and now account for 8% of road transport emissions.[28] Further growth of the vans fleet is forecast since the legal framework for vans is so favourable compared to that for light trucks (> 3,5t). The rising emissions from vans need to be offset with stronger fuel efficiency standards and speed limiters that would discourage overpowered vans. Reverting to the original Commission proposal of 135 g/km in 2020[29] is the minimum that should be considered. However, the new evidence shows that it is cost-effective to adopt a much

[V] This cost benefit includes the shift of the limit value curve because of a change in the average mass of the N1 and M1 categories stronger target as illustrated in Table 5. A target of 118 g/km would double the CO_2 savings and fuel cost-savings compared to the proposed 147g/km target.

	2020 target	**147 g/km**	**135 g/km**	**118 g/km**	**110 g/km**
	Basis	Current target	Original European Commission proposal	Equivalent to cars 95g/km	Equivalent to cars 80 g/km
compared to 175g/km in 2017	Annual fuel cost saving	€ 367	€ 524	€ 752	€ 854
	Absolute price increase	€ 506	€ 965	€ 1,901	€ 2,688
	Payback period of lower fuel costs	1.8 years	2.3 years	3.1 years	3.9 years
compared to 147g/km in 2020	Annual fuel cost saving	€ 0	€ 157	€ 385	€ 487
	Absolute price increase	€ 0	€ 459	€ 1,395	€ 2,182
	Additional payback period of lower fuel costs	0 years	0.5 years	1.3 years	2.1 years
	CO2 saved (M tonnes)	0 megatons	1.6 megatons	2.7 megatons	3.5 megatons
	Improved EU business competitiveness for van users	None compared to current target	Some	High savings for first owners	Highest lifetime savings
	Supports EU sales of fuel efficient vehicles and technologies	Minimal	Some	Considerable	Highest
	Avoids leakage & weakening the cars target	No	No	Yes	Possible vans leakage

Table 5 - Impacts of different target levels compared to 175 g/km & 147g/km baselines

A vans target of 110g/km (equivalent to one for cars of 80g/km) is cost-effective; for 2025 a target of well below 100 g/km is needed.

A sub 100 g/km target for 2025 would reflect a similar level of ambition compared to the required 60g/km for passenger cars and is needed to ensure the uptake of more advanced technologies and new powertrains as well as setting us on the path towards decarbonizing road transport by 2050.

A tighter target would also avoid more than seven years of largely ineffective legislation. The 175g/km 2017 was almost met in 2010 (181g/km). There is ample time and technology available whilst the do nothing option would result in vans becoming a “technology graveyard” and reduce the competitiveness of the European industry compared to overseas competitors. A more stringent vans target than 147g/km would ensure van manufacturers overachieve the weak and largely irrelevant 2017 target.

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References

[1] Assumes average fuel consumption 8.28 l/100km (6.9 l/100km (test) + 20% real world use correction); average mileage of new vans 23,500 km; average diesel price €1.25 per litre (excl. VAT)
[2] Department for Transport, *Ultralow emission vans study*, 2012.
[3] CE Delft, *Are trucks taking their toll*, 2009, p2.
[4] European Commission, *Proposal for a regulation (…) amending Regulation (EU) No 510/2011 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new light commercial vehicles,* 2012.
[5] TNO 2012, Assessment of alternative modalities and targets for LCVs, study for T&E.
[6] Citroen Berlingo: 133 g/km or 5.1 l/100km + 20% real world use correction = 6.1 l/100km; mileage 23500, diesel price €1,25 (excl VAT); Mercedes Sprinter 116cdi: 225 g/km or 8.6 l/100km + 20% real world use correction = 10.3 l/100km; mileage 23,500 km, diesel price €1.25 per litre (excl VAT).
[7] TNO, *Support for the revision of regulation on CO_2 emissions from light commercial vehicles,* 2012, p117.
[8] TNO, *Assessment of alternative targets and modalities for the CO_2 regulation for light commercial vehicles*, TNO study for T&E, 2012, annex B.
[9] Ibidem 7, footnote 5, p37.
[10] AEA, *Assessment of options for the legislation of CO_2 emissions from light commercial vehicles*, 2009, Table 6.4, 100% slope, p50.
[11] AEA, *Assessment with respect to long term CO_2 emission targets for passenger cars and vans*, 2009, 39.
[12] IKA-RWTH, *Kurzstudie zum CO_2-Reduzierungspotenzial bei Leichten Nutzfahrzeugen (N1) bis 2020*, 2010 p12.
[13] http://www.acea.be/index.php/news/news_detail/auto_industry_pushes_hard_to_reduce_co2_emissions_and_needs_supportive_real
[14] http://www.sueddeutsche.de/wirtschaft/eu-beschliesst-strengere-klimaregeln-kleintransporter-duerften-teurer-werden-1.1038618
[15] Ibidem 6.
[16] European Commission, *Commission Impact Assessment accompanying a Regulation for setting emission performance standards for new light commercial vehicles as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles,* 2009, 18.
[17] Ibidem 5
[18] Ibidem 12
[19] TNO, *Supporting Analysis regarding Test Procedure Flexibilities and Technology Deployment for Review of the Light Duty Vehicle CO_2 Regulations,* 2012, to be published (summary of results available as presentation)
[20] Ibidem 5, p34.
[21] T&E, *Fuel efficient vans would be cheaper to buy and run*, 2010.
[22] CE Delft, *Speed limiters for vans in Europe, Environmental and safety impacts*, 2010.
[23] http://www.transportenvironment.org/News/2011/5/First-Germans-now-speed-loving-Italians-want-van-speed-limiters/;
[24] Ibidem 5, p20.
[25] Regulation 510/2011/EU (vans) and Regulation 443/2009/EC (passenger cars).
[26] Commission Regulation No 678/2011.
[27] Ibidem 5, p22.
[28] Ibidem 3, p2.
[29] COM(2009) 593 final, Proposal for a Regulation of the European Parliament and of the Council setting emission performance standards for new light commercial vehicles as part of the Community's integrated approach to reduce CO2 emissions from light-duty vehicles