

The Impact of Phasing in Passenger Car CO₂ Targets on Levels of Compliance



Author: Malcolm Fergusson, IEEP, mfergusson@ieep.eu

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Introduction

The purpose of this analysis is to ascertain what would be the effect of phasing in the proposed targets for Passenger Car CO₂ as has been proposed in amendments tabled in the European Parliament – ie what would happen if only a specified percentage of all sales for each manufacturer were required to comply with each manufacturer group's target in a given year? That is, for each manufacturer, would their existing mix of sales be sufficient to meet the target for this percentage of sales without further effort on their part, or would they need to improve the emissions performance of this part of their fleet to meet the target – and if so, by how much? To answer this question requires complex analysis of the actual distribution pattern of new car sales for each manufacturer, in order to discover what percentage of their sales would be compliant with any given threshold value.

On the basis of data from the EU's Passenger Car CO₂ Monitoring Mechanism, we were able to reproduce the targets that each major manufacturer would face under the proposed legislation, provided that the average weight of their future car sales would remain on average as it was in 2007. This requires complex processing of the sales data to give an accurate picture – analysis which was not undertaken in preparation of the proposed amendments, or at least has not been published hitherto.

Data Source

The data source used for this report is the EU's official car CO₂ Monitoring Mechanism database¹, updated to reflect all car sales in 2007. It was obtained by T&E following submission of a request under laws granting access to official documents containing environmental information². T&E then commissioned the Institute for European Environmental Policy (IEEP) to analyse sales and CO₂ information in this database.

It should be noted that the geographical coverage of the figures is not the entire EU27, but rather the EU18: ie the 'old' EU15 plus Hungary, Lithuania and Slovenia. The other nine Member States had not yet submitted their data by the time T&E requested access to the EU database. Together these nine 'missing' countries represent 6% of total sales in the EU27³, and therefore have relatively little impact on the CO₂ average of sales across the total EU27.

¹ http://ec.europa.eu/environment/co2/co2_monitoring.htm

² http://ec.europa.eu/transparency/access_documents/index_en.htm

³ The T&E report published in 2007 (based on data for 2006) also covered the Czech Republic, Cyprus, Estonia, and Slovakia (96% coverage of EU27 new sales).

Methodology

To answer the question set out above, it was necessary to analyse data from a table in the EU Monitoring Mechanism data named 'T3corr', which gives data on the distribution of new car sales according to the sales in bands of CO₂ emissions. In this table there are 13 designated CO₂ bands, which are typically of width 20g/km, rising to 50g/km for cars with very high CO₂ emissions. Within each of these bands, the table specifies the number of car sales for 2007, and the actual average of car sales within that band, for each manufacturer, fuel type and Member State.

Having first consolidated these data for all brands, fuel types and Member States into manufacturer groups, the next step was to calculate the cumulative registrations for each emissions band from the lowest upwards and the cumulative average emissions up to each band, as this would give a first indication of the cumulative performance of each company. For example, if 19% of registrations for a given company were found to fall in the lowest five bands of CO₂ emissions, then this would account for a large part of the total emissions performance result required to calculate the performance of the company's best 20% of sales.

However, for any given percentage, there would always be an additional percentage that has to be added from within a particular band – in the example cited above, an extra 1% would have to be added in from the sixth band. In this case, the average CO₂ emissions of these extra sales are assumed to be a linear interpolation between the minimum CO₂ value in the band and the average CO₂ emissions of the band as a whole for that particular manufacturer, on the assumption that the first car sold in the band is at the minimum emissions level for the band, but that the average for the band is approached in a linear manner as more cars are added. This is a necessary simplification to reflect the fact that if only a small proportion of sales are taken from a band, then clearly these will have the lowest emissions from within the band, and hence their average will probably be below that of the band as a whole. Conversely, if most of the sales in a given band are needed to make up the numbers, then their average will probably be much closer to that of the band as a whole. However, the database used is not detailed enough to allow for a fully accurate approximation, and this approach was found to give the best available results.

A weighted average was then calculated by adding the sales weighted results for all bands below the critical value as described above, with the relevant proportion of sales within the critical band for each proposed percentage compliance figure. The result of this exercise gives the average emissions performance for each company for the desired proportion of sales that are required to comply.

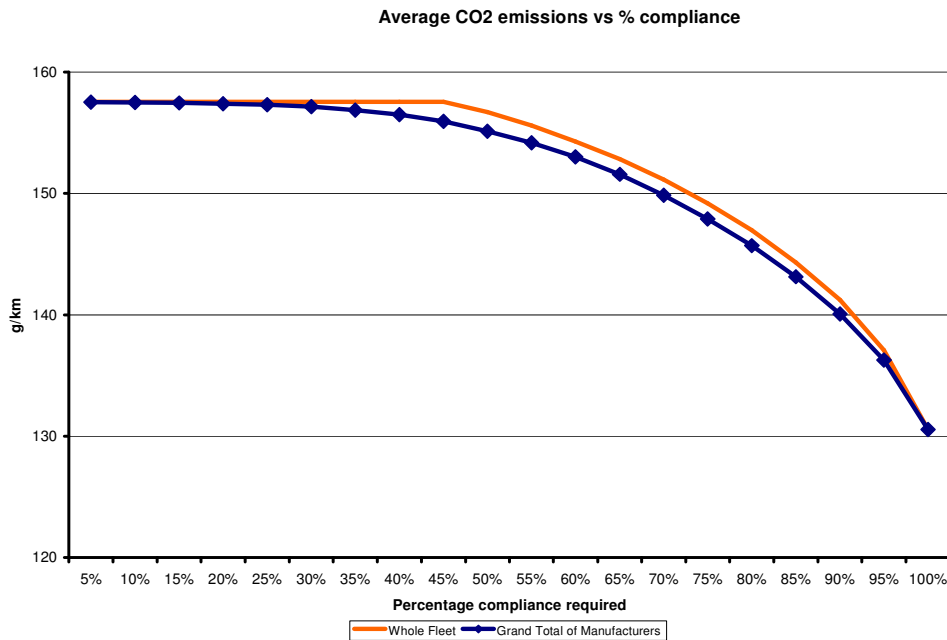
The average emissions for this proportion were then compared to the target for each company (calculated in accordance with the formula proposed in Annex 1 of the Commission's proposal, but with an agreed correction factor added, as a function of the average mass of all the new cars sold by each manufacturer group). Where the calculated proportion of new sales was already below the target for a given manufacturing group, then no further action was required. However where the average was above the target, then it was assumed that the manufacturer would respond by reducing the sales weighted average of the proportion of its fleet required to be in compliance exactly to its respective target.

For that part of the new sales not required to comply with a given percentage compliance target, it was assumed that no further action would be taken and the average emissions would remain as in 2007. A new sales weighted average was then calculated by combining the results for the compliant and non-compliant portions of all sales, in order to give a new sales weighted average for all sales at each percentage compliance for each manufacturer group.

From this two different totals are also added: a 'Whole Fleet' total which represents what the result would be if the whole of the new car fleet were treated as one entity for the purpose of the averaging; and a 'Grand Total' which is the sum of the individual company results. The latter is arguably the more relevant guide to actual outcomes, and it will always give if anything the lower result of the two, because the possibility of averaging between manufacturers is removed; however the difference between the two is in practice very small.

Results and Conclusions of the Analysis

The results of this analysis are presented in graphic form below, showing the effective average CO₂ performance of the whole new car fleet against a full range of possible compliance percentages.



From this it can be seen that:

- The relationship between the percentage compliance and the implied actual target is far from linear, with the higher percentages having a much larger impact on average CO₂ emissions at fleet level.
- A few companies with the highest emissions (and the highest emissions relative to their target) are required to act even at very low compliance percentages, but most are not.

- As a result, compliance percentages below 50% have a negligible effect on the actual average CO₂ level achieved overall. Even at 50%, only a 1% reduction in average CO₂ is achieved.
- Even 90% and 95% compliance figures imply a significant shortfall from the 130g/km target, at 140.1g/km and 136.3g/km respectively.

In conclusion, it can be seen that all suggestions of a percentage phase-in of compliance with the CO₂ target lead to significantly reduced levels of compliance relative to the overall 130g/km target. Compliance percentages of 50% or less are almost completely ineffective in ensuring progress, while levels of phase-in below 90% still imply significant non-attainment of the overall target and extensive delays in meeting it.

Postscript: Two final points about underlying assumptions might also be added:

- This conclusion is based on the assumption in the analysis of full compliance by each manufacturing group with its percentage compliance target. When the effects of other flexibility mechanisms (such as phase-in of fines) on the degree of compliance are also factored in, the effect of this proposed measure on the actual level of reduction is likely to be even weaker and more uncertain reductions in average emissions.
- The analysis above is based on two key simplifying assumptions – that there is no further reduction in average CO₂ emissions between 2007 and 2012, and there is no increase in average vehicle weight between 2007 and 2012. However both of these assumptions are very conservative in this context. If these parameters actually follow current trends in the intervening years (ie CO₂ reduces and weight increases), they both will have the effect of reducing the distance to target for affected manufacturers. In this case the phase-in proposal would encourage most manufacturers to do less and delay even longer in doing it.