

# **Reducing CO2 Emissions from New Cars: A Study of Major Car Manufacturers' Progress in 2006**

November 2007



European Federation for  
TRANSPORT and ENVIRONMENT

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A Study of Major Car Manufacturers' Progress in 2006**

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## Important Note

For three reasons this report / ranking is not comparable with a similar-sounding study published by T&E in October 2006, "How clean is your car brand?".

1. The 2006 study was based on EU15 sales data, while this study is based on EU25 data minus Latvia, Malta and Poland (which together account for less than 2% of the EU market).
2. The 2006 study ranked car brands, while this study ranks car manufacturer groups (companies).
3. This study is based on a different data source.

It is therefore not possible, or appropriate to compare the performance of a given company in this year's study with the performance of a given brand in last year's.

The most important reason for this change of scope is that the supplier of sales data for the earlier study, R L Polk Marketing Systems GmbH of Germany declined to supply CO<sub>2</sub>-based sales data for the purposes of this year's report. Other car industry data sources approached by T&E's consultants also declined to supply CO<sub>2</sub> sales data for the purposes of this report.

The fact that data that had been previously provided on commercial terms was refused without explanation has led T&E to assume that the company in question was put under pressure from their main client base, the car industry, not to reveal the information. R L Polk GmbH has not given any reason for their change in policy.

Despite this setback, T&E believes that the performance of car companies in reducing greenhouse gas emissions from their products is clearly an issue of great public interest. It is also in the interests of investors, customers and policymakers that this information should be put into the public domain.

Instead, T&E obtained access to the EU's own official monitoring data after submitting a request under EU laws granting access to official documents. It is regrettable that car companies and the European Commission have so far refused to publish this information themselves. Indeed the Commission specifically agreed not to publish company-specific data when it signed a voluntary commitment with the car industry on cutting CO<sub>2</sub> in the late 1990s.

## Acknowledgements

T&E would like to thank the Institute for European Environmental Policy (IEEP), London, UK who performed the underlying data analysis for this year's study and the Esmée Fairbairn Foundation for funding the research.

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## Context

In February 2007 the European Commission published a review of the EU strategy on reducing carbon dioxide emissions (CO<sub>2</sub>) from new cars. That review announced future regulation, for the first time.

Both the European Parliament and national environment ministers have had their say on the proposed strategy in advance of legislation expected to be presented by the Commission by the end of 2007. A legal proposal would then need to be approved, again by the Parliament and national environment ministers before becoming law, a process that typically takes 1-2 years.

## Background: EU climate change policy

The European Union is committed under the Kyoto Protocol to reduce greenhouse gas emissions by 8 per cent by 2008-2012 compared to the 1990 level. In March 2007 EU leaders committed to a 20-30% reduction in greenhouse gas emissions overall by 2020.

## The role of transport

Transport is the worst performing sector under 'Kyoto' and seriously jeopardises the achievement of the targets. Transport CO<sub>2</sub> emissions in the EU grew by 32% between 1990 and 2005. Other sectors reduced their emissions by 9.5% on average over the same period. The share of transport in CO<sub>2</sub> emissions was 21% in 1990, but by 2005 this had grown to 27%. Emissions from so-called 'light duty vehicles' (passenger cars and vans) are responsible for approximately half of this.

## The car industry target and the voluntary commitment

The EU target to reduce average new car emissions to 120 g/km was first proposed by Germany at a meeting of European environment ministers in October 1994. The 120g/km target was formally announced in a European Commission communication in 1995. The 120 g/km target represents a 35% reduction over 1995 levels. As CO<sub>2</sub> is directly linked to fuel consumption, the 120 g/km target corresponds to a fuel consumption of 5 litres per 100 km for petrol cars and 4.5 litres per 100 km for diesel cars.

Originally the target date was set for 2005. Up to now, the target has been postponed or weakened three times.

The first postponement occurred in 1996 when the Environment Council introduced the term 'by 2005, or 2010 at the latest'.

The second postponement happened in 1998 when the European Automobile Manufacturers Association (ACEA) committed to the EU to reduce the average CO<sub>2</sub> emissions from new cars sold in the EU to 140 g/km by 2008. This is a reduction of 25% over 1995 levels, and equivalent to a fuel consumption of 6.0 litres per 100 km for petrol cars and 5.3 litres for diesel cars. The Commission agreed to postpone the deadline for delivery of the '120' target to 2012. In 1999, Japanese (JAMA) and

Korean (KAMA) carmakers made similar voluntary commitments, to achieved 140 g/km by 2009.

The third weakening happened in February 2007 when the European Commission proposed to move the target for 2012 from 120 to 130 g/km. The Commission said that the missing 10 g/km should be taken up by non-car related measures such as biofuels.

## Overall progress of the commitment

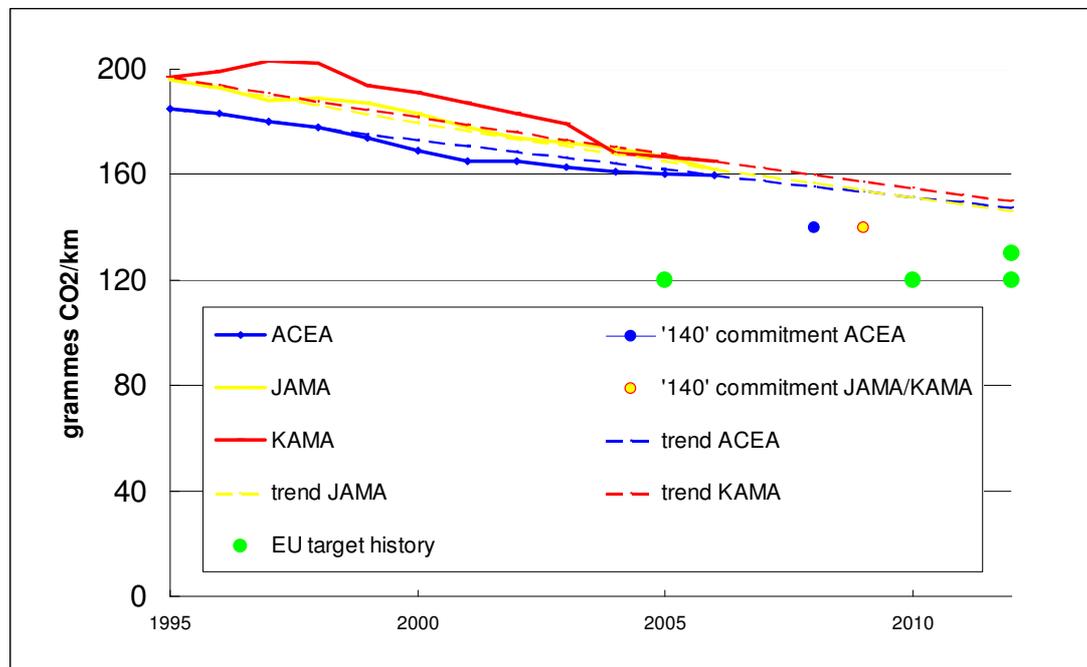
Carmakers are not reducing CO2 emissions of their products fast enough to meet the 140 g/km target by 2008/9.

In September 2007, T&E presented the latest evidence of this - the progress of the commitment in 2006. The results are shown below in a table and a graph.

Table 1: progress in 2006 of the CO2 commitment of the three car manufacturing associations

	ACEA	JAMA	KAMA	Total
2004 (g CO <sub>2</sub> /km)	161	170	168	162
2005 (g CO <sub>2</sub> /km)	160	166	167	161
2006 (g CO <sub>2</sub> /km)	160	161	164	160

Graph 1: progress over time in the CO2 commitment of the three car manufacturing associations, and distance to target if historic rate of improvement is not changed



If present trends continue, ACEA would miss the 140 g/km target by approximately 15 grammes, and JAMA/KAMA by 13 and 16 grammes respectively.

## Performance of major car manufacturers in 2006

T&E commissioned the independent Institute for European Environmental Policy (IEEP) in London to analyse sales and CO<sub>2</sub> information in the European Commission database that forms the basis of the official EU monitoring mechanism on cars and CO<sub>2</sub> ([http://ec.europa.eu/environment/co2/co2\\_monitoring.htm](http://ec.europa.eu/environment/co2/co2_monitoring.htm)). T&E was granted access to the database following a request under EU laws granting access to official documents ([http://ec.europa.eu/transparency/access\\_documents/index\\_en.htm](http://ec.europa.eu/transparency/access_documents/index_en.htm)). The EU data covers the EU25 with the exception of Latvia, Malta and Poland (together less than 2% of the EU25 market).

Only large volume car manufacturing groups (those that sold over 200,000 vehicles in Europe in 2006) were included in the study.

IEEP produced two sales-weighted rankings.

### Progress in 2006

The first shows the improvement (or lack of it) in the fleet-average CO<sub>2</sub> emissions of each given carmaker group in 2006 compared with the previous year. The right hand columns of the table also show the sales-weighted average weight of cars sold.

Manufacturer group	Sales 2006 (1,000)	Average CO <sub>2</sub> emissions (g/km)			Average weight (kg)		
		2005	2006	%	2005	2006	%
Toyota	848	161	153	-5.0%	n/a	n/a	
Honda	249	160	154	-3.8%	n/a	n/a	
PSA Peugeot Citroen	1,929	146	142	-2.7%	1291	1282	-0.7%
BMW	761	188	184	-2.5%	1540	1537	-0.2%
Mazda	242	177	173	-2.0%	n/a	n/a	
Nissan	534	171	168	-1.6%	n/a	n/a	
Hyundai	308	168	167	-0.8%	n/a	n/a	
Renault	1,275	148	147	-0.8%	1294	1294	0.1%
Fiat	1,088	145	144	-0.5%	1150	1190	3.5%
Ford	1,571	163	162	-0.5%	1378	1393	1.1%
General Motors	1,500	157	157	-0.3%	1309	1336	2.1%
Volkswagen	2,940	165	166	0.9%	1444	1460	1.0%
Suzuki	229	164	166	1.8%	n/a	n/a	
DaimlerChrysler	876	182	188	2.8%	1499	1561	4.1%
German groups		172	173	0.6%	1471	1492	1.4%
French groups		147	144	-1.9%	1292	1287	-0.4%
French + Italian		147	144	-1.6%	1261	1262	0.1%
Japanese groups		166	161	-2.8%			

#### Notes:

- 'German groups' include Volkswagen, DaimlerChrysler (now Daimler) and BMW.
- 'French groups' include PSA and Renault
- 'French and Italian groups' include French groups plus Fiat
- 'Japanese groups' include Toyota, Honda, Mazda, Nissan and Suzuki
- the quality of weight data for Japanese and Korean manufacturers was judged by IEEP to be insufficient to be included in the overall rankings

The following conclusions can be drawn from this table:

- German groups saw their average CO<sub>2</sub> emissions increase by 0.6%. The improvement of 2.5% at BMW was more than offset by deteriorations at

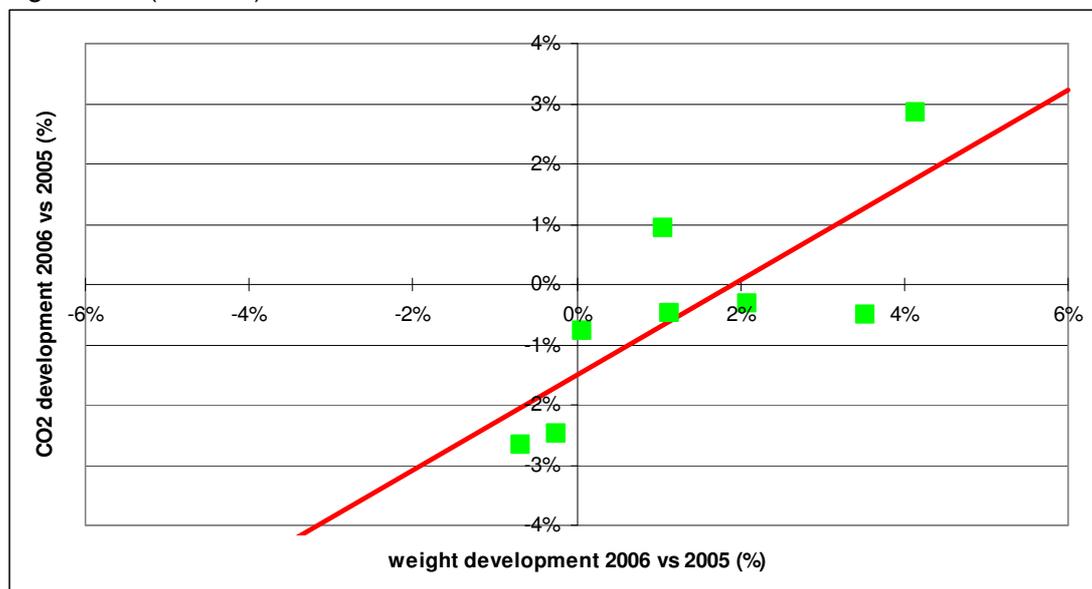
DaimlerChrysler (the worst volume manufacturer in terms of CO2 progress in 2006) and Volkswagen (the third worst)

- French groups saw their emissions decrease by almost 2 per cent on average
- Japanese groups saw their emissions decrease by 2.8% on average. This was primarily driven by strong reductions at Toyota and Honda (the best and second best volume manufacturer in terms of CO2 development in 2006)

### The importance of cutting weight in reducing emissions

There is a strong relationship between a car's weight on the one hand and its fuel consumption and CO2 emissions on the other. The graph below shows this relationship: it shows that, as a rule, the more a manufacturer's average car weight increased, the more its average CO2 emissions increased.

Graph: last year's relationship between developments in fleet average weight and fleet average CO2 of the eight manufacturer groups (green dots) and the linear regression (red line).



Note: the regression formula is:  $CO_2 \text{ development (in \%)} = 0.789 * \text{weight development (in \%)} - 1.5\%$ .  $R^2$ , the coefficient of determination, is 0.61.

The following conclusions can be drawn from the above graph:

- Approximately 61% of the development in fleet average CO2 emissions of the manufacturers in 2006 can be explained by developments in the average weight of their vehicles.
- Every percent of weight saved is associated with a 0.8% emission reduction.
- As an illustration, PSA and BMW, the only European manufacturers that managed to cut weight, also top the ranking of European manufacturers in terms of CO2 reductions in 2006. On the other hand, the poor CO2 performance of DaimlerChrysler is to a large extent explained by the big (around 4%) increase in the average weight of their cars.

## Overall average CO2 ranking

The second ranking shows the sales-weighted fleet average CO2 emissions for each carmaker group in 2006. Carmakers that sold the most fuel efficient cars, on average, are at the top of the list, those that sold the least fuel efficient cars are at the bottom. See below.

position	Manufacturer	Fleet average CO2 emissions in 2006 (g/km)
1	PSA Peugeot Citroen	142
2	Fiat	144
3	Renault	147
4	Toyota	153
5	Honda	154
6	General Motors	157
7	Ford	162
8	Suzuki	166
9	Volkswagen	166
10	Hyundai	167
11	Nissan	168
12	Mazda	173
13	BMW	184
14	DaimlerChrysler	188

This table shows that PSA Peugeot Citroen, the number three in terms of improvement in 2006, tops the list, and DaimlerChrysler, last year's worst performer in terms of improvement, is at the bottom. The gap between good and bad performers is widening.

## Regulation – key issues

Regulating the fuel consumption and CO<sub>2</sub> emissions of new cars is the single most effective policy measure the EU can take to simultaneously tackle climate change, reduce dependence on oil, and spur investment in low-carbon car technologies in Europe and elsewhere.

### **120g by 2012**

The deadline for reaching 120g has already been postponed twice, first to 2010, then to 2012. It is a matter of political credibility not to postpone the deadline any further. Recent research shows that if all cars on the market were equivalent to today's 'state of the art', CO<sub>2</sub> emissions would already be 20-25% lower than today even without car engine downsizing, or a move to hybrid technology.

### **Long term targets are needed**

Long-term targets for 2020 and 2025 are necessary to give the industry a long-term perspective for the development of more fuel efficient cars. 80g CO<sub>2</sub> /km is needed by 2020 and 60g by 2025 in order to be consistent with scenarios to reduce CO<sub>2</sub> emissions by 30% by 2020 and 60-80% by 2050.

### **If differentiated CO<sub>2</sub> targets are introduced, they should not be based on weight**

We believe that Europe should have one fleet average standard for all cars sold in a given year, without distinction between classes of car.

If however some differentiation on utility parameter should be allowed then the parameter should be a car's 'footprint' (track width multiplied by wheelbase), not its weight. The use of vehicle weight as the parameter would reduce the incentive to cut down on a car's weight. Weight reduction is one of the most important ways of cutting CO<sub>2</sub>, as this report shows. The resulting higher weight of cars would lead to more fatal accidents, higher emissions, and higher costs according to research carried out in the United States.

In the US, weight-based standards have been a failure. They have led to an average vehicle weight increase of 28% since 1987. This was due to a massive shift in the market towards heavier vehicles.

In March 2006, after 30 years of using a weight-based system to define light-truck fuel efficiency standards, the US adopted a footprint-based system that will enter into force within the next few years. The rules cover almost 50% of the US market for light-duty vehicles, around 7 million per year. Most observers expect that future US car fuel efficiency and CO<sub>2</sub> rules will also be based on footprint.

## **Strict penalties are needed**

A robust compliance regime is essential for the functioning of legislation on CO<sub>2</sub> and cars. Penalties should be high enough to ensure that carmakers really comply with the targets instead of just paying the penalty. Sales of low emitting cars could offset those of high emitters but any excess CO<sub>2</sub> over the target for the average car should be charged at €150 per g/km, per vehicle sold.

## **Sales of flex-fuel cars should not count towards an energy-efficiency target**

Flexfuel cars (cars which can run on high blends of biofuel) should not be rewarded for a policy designed to promote technical fuel efficiency. Biofuels are also a scarce resource and are not a substitute for energy efficiency measures. Given the crucial role of vehicle efficiency in achieving climate and oil dependence objectives such an 'escape' would be unacceptable.

## **Costs**

Investments in low carbon technology research and manufacturing will create employment in Europe. Additional costs to car buyers will be offset by savings on fuel and the resulting lower fuel prices. Overall, society and the economy will benefit considerably from legislation to reach 120g/km by 2012.

## **Further reading**

T&E position paper on cars and CO<sub>2</sub>

[www.transportenvironment.org/Article454.html](http://www.transportenvironment.org/Article454.html)

Danger ahead: why weight-based CO<sub>2</sub> standards will make cars dirtier and less safe

[www.transportenvironment.org/Article457.html](http://www.transportenvironment.org/Article457.html)

2006 progress report on the car industry's voluntary commitment

[www.transportenvironment.org/Article459.html](http://www.transportenvironment.org/Article459.html)