COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMISSION STAFF WORKING DOCUMENT

Accompanying document to the

PROPOSAL FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND COUNCIL

for a regulation to reduce CO_2 emissions from passenger cars

Executive Summary of the Impact Assessment

{COM(2007)856 final}
{SEC(2007)1723}

1. PROBLEM DEFINITION

The overarching problem identified in the CO_2 and cars and CARS21[1] Communications is that policies to reduce CO_2 emissions and improve the fuel efficiency of new cars sold in the EU have not delivered the progress needed to reach the long-standing EU objective of an average new car fleet emission of 120 g CO_2/km. The Commission has thus decided to propose a legislative framework implementing an "integrated approach" to deliver 120 g CO_2/km by 2012, focusing on mandatory reductions to reach the objective of 130 g CO_2/km on average for the new car fleet through improvements in vehicle motor technology, and a further reduction of 10 g CO_2/km, or equivalent if technically necessary, by other technological improvements and by an increased use of bio-fuels. The specific problem is how to design a legislative instrument reflecting the principles outlined by the Commission in the above mentioned Communications.

2. OBJECTIVES

2.1. Policy objectives

The proposal pursues the following general policy objectives:

- Providing for a high level of environmental protection in the European Union and contributing to reaching the EU's Kyoto targets,
- Improving the EU energy security of supply,
- Fostering the competitiveness of the European automotive industry and encouraging research into fuel efficiency technologies.

The specific objectives cover:

- Reducing the climate change impacts and improving the fuel efficiency of passenger cars by reaching an average emission value of 130 g CO_2/km for newly sold cars

The operational objectives include:

- Designing a legislative framework implementing the average new car fleet target ensuring competitively neutral and socially equitable and sustainable reduction targets which are equitable to the diversity of the European automobile manufacturers and avoid any unjustified distortion of competition between automobile manufacturers. The legislative framework will be compatible with the overall objective of reaching the EU's Kyoto targets.

2.2. Consistency with horizontal objectives of the European Union

The policy objectives promote innovation and technological development, enabling the EU industry to achieve global leadership in the field of fuel efficient technologies in view

[1] COM(2007) 19, 07.02.2007 and COM(2007) 22, 07.02.2007

of oil scarcity and of fuel efficiency legislation in other countries, contribute to the Growth and Jobs agenda and promote highly qualified jobs in Europe. The policy objectives are in line with the Renewed Sustainable Development Strategy spelled out in June 2006 by the European Council which unanimously reconfirmed[2] that "*in line with the EU strategy on CO_2 emissions from light duty vehicles, the average new car fleet should achieve CO_2 emissions of 140g/km (2008/09) and 120g/km (2012)*".

3. POLICY OPTIONS

(1) **Uniform target:** a common CO_2 emission limit is set for each manufacturer for the average of their new cars sold in 2012. To be workable, this option needs to rely on a trading mechanism providing the necessary flexibility in view of the current diversity of car manufacturers' product portfolios;

(2) **Utility parameter based limit curve:** a linear function provides the CO_2 limit as a function of vehicles' utility (mass or footprint). If mass is used, assumptions need to be made on the future development of the Autonomous Mass Increase (AMI), to account for the fleet's evolution. Four scenarios have been identified: 0%, 0.82%, 1.5% and 2.5% per year AMI. The inclination of the linear function ("% slope") will influence the burden sharing between manufacturers and the environmental outcome;

(3) **% reduction based targets:** a fixed reduction corresponding to the distance between the 2006 level of 160 g CO_2/km and the 2012 target of 130 g CO_2/km (circa 19%) is required from all manufacturers against their 2006 levels.

In terms of flexibility, the options of fleet averaging within manufacturers, between manufacturers (pooling) and full trading between manufacturers are examined. For all options, on the basis of the cost estimates provided in the supporting study, excess emission premium (EPP) levels of 7€/gram, 10€/gram, 25€/gram, 95€/gram and 150 €/gram are considered, including the possibility of a gradual increase in the level of the premiums over time.

4. ANALYSIS OF IMPACTS

4.1. Economic impacts

The economic impacts for the society are mostly function of the targets defined by the Commission in its earlier Communications and impact assessments[3]. While the least cost option for manufacturers overall would be based on Option 2, with a 123% inclination, cost increases per car do not vary greatly when fleet averaging is allowed for other inclinations or options. Thus other options than the cost-optimised one could be taken, in view of other objectives. As regards **Option 1**, a uniform target of 130 g CO_2/km for all means that manufacturers of smaller cars would find it easier to comply than manufacturers of big cars. This raises concerns with regard to the diversity of European

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2 Renewed EU Sustainable Development Strategy, June 2006

3 CO_2 and cars: SEC(2007) 60, 07.02.2007; CARS21: SEC(2007) 77, 22.03.2007

carmakers and is not competitively neutral, as it penalises manufacturers of larger cars without a sufficient incentive for manufacturers of smaller cars to continue reducing their CO_2 emissions below 130 g/km in the absence of a trading system. **Option 2** delivers the most even *sales-weighted* distribution[4] of relative retail price increase per manufacturer, for slopes of 74% to 80% for mass, and 64% to 68% for footprint; the most even *un-weighted* distribution of relative retail price increase per manufacturer is delivered for slopes of 39% to 47% for mass, and 18% to 27% for footprint (depending on AMI). **Option 3** leads to a lower average cost than Option 1 and 2, and to a seemingly even distribution of the relative retail price increase for all manufacturers. However it locks manufacturers of small vehicles in their present market position, while manufacturers of large vehicles can meet their target by widening their market offering. It would also lead to higher costs for early movers. Trading evens out the distribution of relative price increases, and leads to a reduced sensitivity of manufacturers to the slope for Option 2. However, liquidity of the market is not certain and transaction costs are likely to be higher than with pooling.

4.2. Social impacts

For **employment**, assuming price elasticities for new car sales between 0 and -1 (i.e. fairly inelastic), a 6% price increase will lead to less than 6% reduction in sales - i.e. the total value of sales will rise slightly. Therefore, lower vehicle sales within the EU will not necessarily lead to loss of jobs in the automobile industry, and could lead to a rise in direct employment depending on what share of extra costs go into extra labour. The direct impact seems likely to be relatively marginal. Besides, suppliers play an increasing role in the value chain over time. Higher prices should produce a strong positive multiplier effect higher up the supply chain, and some of this should translate into extra employment. Relocation of manufacturing capacity outside Europe in response to higher costs could be a concern. However, car manufacturers tend to locate new production facilities on the markets for which the vehicles are destined and all manufacturers, domestic and foreign will have to respect the legislation. In terms of **social equity**, the vehicle retail price increase will be more than compensated by lifetime fuel savings. Regarding affordability, for **Option 1**, the relative retail price increase for small vehicles is about the same as that for large vehicles, but still larger than that for medium-sized vehicles. For diesel vehicles this condition is met for **Option 1** and **2**. At the manufacturer level, for **Option 2**, for inclinations below 80%, up to 80% or more of the vehicles sold in Europe would be exposed to an average relative retail price increase per manufacturer below or around the average value. For mass, impacts on certain small car manufacturers can be seen above a 70% inclination. At the vehicle level, for slopes below 60% and without fleet averaging/with cross subsidisation, small petrol cars face lower relative retail price increases than medium and large petrol cars. For **Option 3**, the relative retail price increase is higher for manufacturers of small/light/low CO_2 emitting cars, which raises affordability and fairness concerns.

[4] Excluding Porsche and Subaru in view of the specificities of their fleet – high emitting petrol cars – which would make the optimisation meaningless

4.3. Environmental impacts

For **Option 1**, because by definition the target is the same for all manufacturers (130 grams), the environmental outcome is linked to liquidity of the market and to the efficiency of the compliance mechanism. It is unclear whether the market would function effectively i.e. whether there would be enough credits to trade. Going beyond market strategies, the level of the premiums will be crucial to the effectiveness of the scheme. In case of **Option 2** "Utility parameter" assumptions on AMI are crucial in the definition of the linear function in order to ensure that the 130 g CO_2/km target will be delivered and not under or over achieved. In addition, to avoid an incentive to increase mass for manufacturers (to have a lower CO_2 obligation) the slope of a mass-based limit function should be below 80%. In the case of **Option 3** "% reduction", under the hypothesis that the market position of the various manufacturers remain the same both in terms of segmentation and of market share, then the delivery of the environmental outcome will mainly be linked to the level of the premiums. However, in case the market is subject to profound changes, carmakers could meet their CO_2 obligation but the overall target of 130 g CO_2/km would not be delivered.

4.3.1. Compliance mechanism: premiums and the environmental outcome

Figure 1 presents the possible impact of the chosen premium scenario levels on the automotive industry as a whole under the assumption that the target is missed by a range of 1 to 10 g CO_2/km. Figure 2 presents the expected fleet average CO_2 emissions for different levels of the premium.

Figure 1 - Cumulated annual premium payments (source for profit figures: industry financial reports)

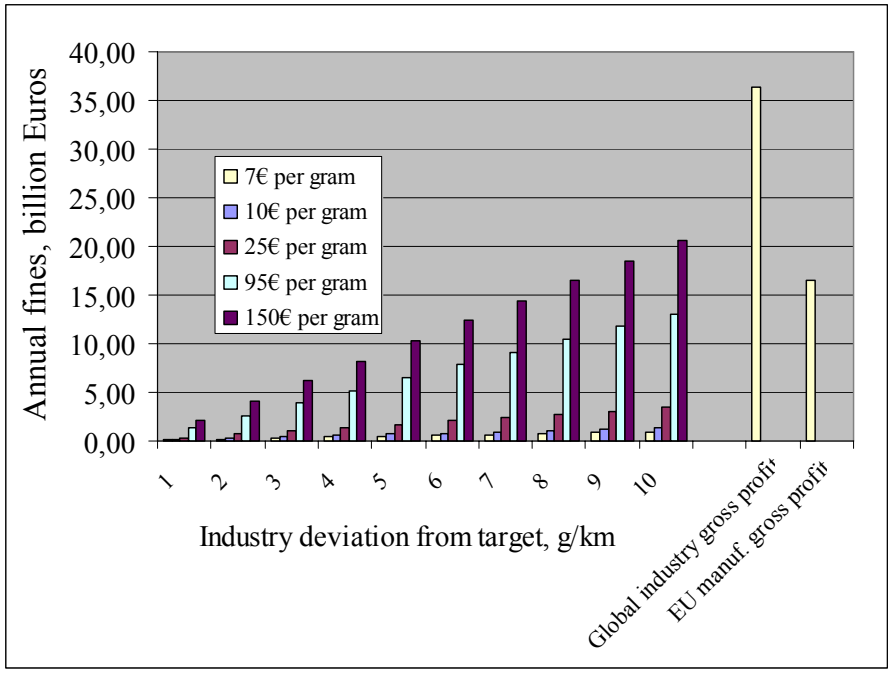
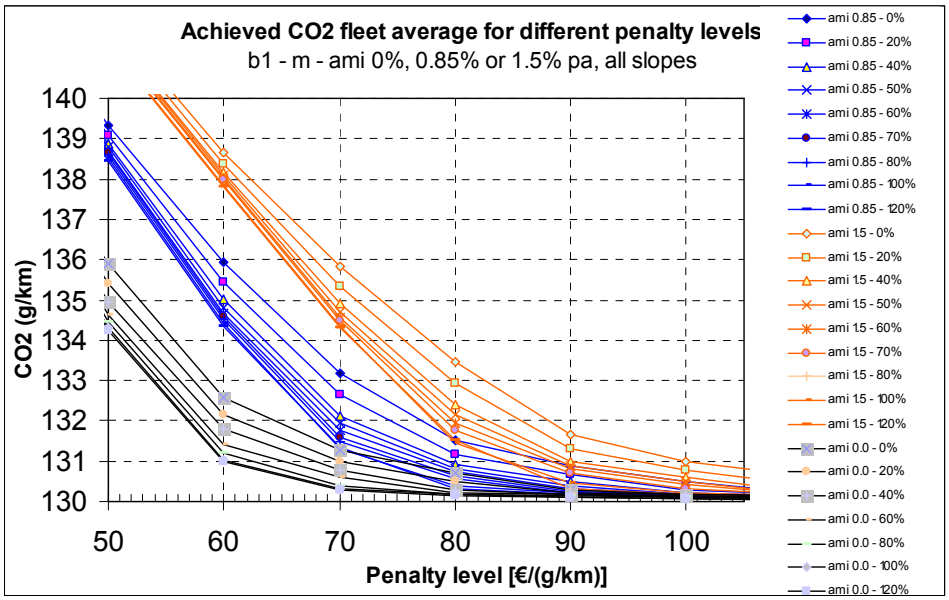


Figure 2 – CO_2 fleet average for different levels of premium



5. COMPARING THE OPTIONS

5.1. Comparison of the three options

	Option 1 **Uniform target**	**Option 2** **Utility approach**	**Option 3** **% reduction**
CO_2 reductions	624 Mt CO_2 eq.	634 to 638 Mt CO_2 eq.	626 Mt CO_2 eq.
Cost-effectiveness[5]	16 to 46 €/ton CO_2	32 to 40 €/ton CO_2	29 to 34 €/ton CO_2
Competitive neutrality/avoidance of unjustified distortions of competition	☹ Producers of low emitting vehicles are winners, and high emitters are losers, since the target is the same for all	😐/☺ Slopes of 74 to 80% for mass and 64 to 67% for footprint achieve the most even distribution of *sales-weighted* average retail price increase. The most even *un-weighted* distribution is delivered for slopes of 39% to 47% for mass and 18% to 27% for footprint. For mass, depending on the assumptions in building the curve regarding the evolution	☹ Manufacturers of small vehicles get locked in their current market segment, while producers of bigger cars can either reduce CO_2 on their current fleet or develop sales in the small and medium segments

[5] The cost-effectiveness calculations are based on the period 2006-2020

	Option 1 Uniform target	Option 2 Utility approach	Option 3 % reduction
		of the fleet's mass, the curve could result in reduction requirements below 130 g CO_2/km	
Social equity	😐/☺ The option rewards low emitting/small medium vehicle producers, thus maintaining the affordability of the most sold vehicles in Europe. For a high level of fleet averaging/without cross subsidisation, small petrol cars may face higher relative price increases	😐/☺ For slopes below 80%, most mainstream manufacturers of small/medium cars representing 80% of the market sales are exposed to below average retail price increases. For mass, impacts on certain small car manufacturers can be seen above a 70% slope. At the vehicle level, for slopes below 60% and without fleet averaging/with cross subsidisation, small petrol cars face lower relative retail price increases than medium and large petrol cars	☹ Because all manufacturers have to deliver the same relative reduction, manufacturers of small cars (which are already low emitters) face relatively high costs
Sustainability /compatibility with Kyoto targets	😐/☺ The target being 130 g CO_2/km for all manufacturer, its delivery will be function of whether the trading system will actually function smoothly, and of the level of the financial penalties	😐/☺ For inclinations below 80% the possible perverse incentives to increase mass are avoided. However for mass, depending on the assumptions in building the curve regarding the evolution of the fleet's mass, the curve could result in missing the 130 g CO_2/km target	😐/☺ Outcome depends on the respective evolution of manufacturers market shares, which cannot be controlled
Equity to the diversity of	☹	☺	☺

	Option 1 Uniform target	Option 2 Utility approach	Option 3 % reduction
European manufacturers	See comment on competitive neutrality	Approach favourable, pooling reinforcing this effect	Approach favourable, pooling reinforcing this effect

Option 2 seems the most promising subject to a number of caveats regarding the underlying assumptions in the establishment of the curve, its inclination and function of the utility parameter chosen.

5.2. Utility parameter (Option 2)

	Mass	Foot-print	Discussion
Good measure of utility	=	+	Mass is a proxy for other utility parameters such as vehicle size, special features. Footprint is directly linked to the utility (e.g. family car vs. mini town car)
Data availability	++	=/-	Mass readily available and reported. Footprint defined as inner surface between the wheels is not yet reported. Footprint defined as total surface (length times width, also called pan area) is available but not reported yet.
Impact on manufacturers	=	=	Both parameters result in comparable impacts in terms of relative price increase for manufacturers. Mass provides a better distribution of burden between manufacturers overall. Footprint is slightly more favourable to small car manufacturers.
Understandable	+	=/-	Footprint defined as the surface within the four wheels is less easy to apprehend.
Avoids perverse effects/gaming	-	=	Perverse effect of mass increase prevented by choosing a slope below 80%. Footprint less likely to be manipulated.
International compatibility	+	=	Mass is used for passenger cars in China and the Japan while footprint is used in the U.S. for light trucks
Allowing all relevant reduction technique	--/-	++	Mass reduction allows CO_2 reduction Some of its "reduction" potential will be annihilated by a mass based curve. This will be function of the inclination of the line.

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Preliminary conclusions suggest a preference for a mass-based system provided perverse effects are avoided and that the future evolution of the AMI is taken into account.

5.3. Assessment of different slopes against the operational objectives

The **least cost solution** is for the 123% slope curve, meaning that smaller cars do more than bigger cars - because "overall" it is cheaper to do it on small cars even if affordability problems would arise. In absolute terms price variations in relation to different slopes are small and thus other criteria could justify different slopes. In terms of **Competitive neutrality**, the most even *sales-weighted* distribution of relative retail price increase per manufacturer is achieved for slopes of 74% to 80% for mass, and 64% to 68% for footprint (depending on the assumptions made on AMI). The most even *un-weighted* distribution of relative retail price increase per manufacturer is delivered for slopes of 39% to 47% for mass, and 18% to 27% for footprint (depending on the assumptions on AMI). Regarding **Sustainability**, perverse incentives linked to mass are avoided for slopes below 80% and the assumptions on the AMI are crucial to avoid over- or under-shooting 130 g CO_2/km. For **Social equity**, for slopes below 80%, mainstream manufacturers of small/medium cars representing 80% of the market sales are exposed to below average retail price increases. For mass, impacts on certain small car manufacturers can be seen at 70%. At the vehicle level, below 60% and in the absence of fleet averaging/with cross subsidisation, small petrol cars face lower relative retail price increases than medium and large petrol cars. The **diversity of manufacturers** is respected through competitive neutrality and by allowing pooling. The application of these criteria would, on the basis of initial analysis, suggest that in order to strike a balance between them, a range between 50% and 80% should be considered further at this stage.

6. MONITORING AND EVALUATION

The monitoring and evaluation arrangements could rely on two sources of data, and be administered by the Commission: Member States would carry on reporting data (as was done under Decision 1753/2000/EC). Manufacturers could also be required to report data.