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Monitoring of ACEA’s Commitment on CO₂ Emission Reductions from Passenger Cars (2002)

Monitoring of JAMA’s Commitment on CO₂ Emission Reductions from Passenger Cars (2002)

Monitoring of KAMA’s Commitment on CO₂ Emission Reductions from Passenger Cars (2002)

Final Reports
5 September 2003

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Monitoring of ACEA’s Commitment on CO₂ Emission Reductions from Passenger Cars (2002)

Final Report 5 September 2003

Joint Report of the European Automobile Manufacturers Association and the Commission Services
ES

SUMMARY OF PROGRESS IN DELIVERING THE COMMITMENT

E1 Trends in specific emissions of CO₂ (g/km)

In 2002 - taking official EU data - the average specific emissions of ACEA's new car fleet registered in the EU was 165 g/km. For petrol-fuelled cars, specific emissions were 172 g/km; for diesel-fuelled cars, the corresponding value was 155 g/km and for alternative fuelled passenger cars the value was 177 g/km.

Compared to ACEA's 2001 data, ACEA reduced the average specific CO₂ emissions of its new car fleet registered within the EU by about 2 g/km; a reduction of 1.2 %.

With official EU data becoming available, a discontinuity from the past data series exists, because of underlying differences (see Section 2.10). It is therefore not correct to simply adjoin official data for the most recent year, onto ACEA's historical data.

As recognized by the European Commission in the Recommendation of 5 February 1999 on the reduction of CO₂ emissions from passenger cars (1999/125/EC). Hereafter referred to as “The Commitment”.

According to the Joint Monitoring System prior 1995-2001 monitoring was based on data provided by ACEA which are broadly similar to those specified in Annex I of Decision 1753/2000/EC. In 2002 for the first time, official EU data is used in the joint monitoring based on data delivered by Member States under Decision 1753/2000/EC. Annex 2 contains comparisons of data from EU and ACEA sources, whenever appropriate.

These are all vehicles not using diesel or petrol, e.g. LPG, CNG or electric power.

In the 2002 report ACEA data continues to be used in certain places, in particular where consistent longer-term trends contribute to a better understanding of CO₂ reduction developments (and official EU data is not available to fulfil this role).

All percentage figures are based on unrounded numbers.

See COM(2002)693 final. Please note that the official EU data cover alternative fuels, ACEA data does not. However, in the light of the small number of alternative fuel vehicles registered this has no impact on the reported EU averages.

Figure 1 shows in particular ACEA time-series data for 1995 to 2002. In the 2001 joint Monitoring Report, ACEA's 2001 CO₂ figure was shown as 164 g/km. This figure included a cycle change correction factor (see Section 2.11) of 1 %; the Commission and ACEA have now agreed that the correction factor should be 0.7 %. This means that, using exact figures, ACEA's CO₂ figure in 2001 was 164.5 g/km, or using the rounded figures normally quoted in this report 165 g/km (see Annex 2).
Using ACEA's 1995 time-series between 1995 and 2002, ACEA achieved an overall reduction in new car CO$_2$ emissions of 12.1%; petrol cars were down by 9.0%, and diesel cars were down by 13.6%.

**E2 Trends in specific fuel consumption by fuel type (litres/100km)**

Fuel consumption in terms of litres per 100 km (l/100km) has followed a similar downward profile to that of CO$_2$ emissions. Over the 1995 to 2002 period, using ACEA's time-series data, average fuel consumption fell for new petrol and diesel cars combined from 7.6 l/100km to 6.5 l/100km. The corresponding consumption reductions for new petrol cars and new diesel cars decreased from 7.9 l/100km to 7.2 l/100km and from 6.6 l/100km to 5.7 l/100km, respectively (see Figure 2).

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9 Please note, ACEA figures do not include alternative fuels. The official EU data cover alternative fuels, e.g. they are included under "all" in Figure 1.

10 The following conversion factors were used for the calculation of specific fuel consumption (l/100km) from specific CO$_2$ emissions (g/km): petrol 23.7, diesel 26.6.
ACEA has achieved these sizeable improvements in new car CO₂ performance whilst increases in physical fleet characteristics have occurred. Overall figures for average car mass, engine capacity and power increased in 2002, compared to 2001 (see Annex 2). However, based on ACEA's time-series data, some car characteristics decreased in 2002 compared to earlier periods; for example, petrol car mass (down on 1999) and diesel engine capacity (down on 1996).

Technical developments introduced by ACEA manufacturers in 2002 included: fully variable valve lift & timing technology combined with GDI; variable intake control system on small gasoline engines; fast warm-up cooling systems; torque converter lock-up from 1st gear on automatic transmissions; application of low-viscosity/friction oil (engine and rear axle) across model-ranges; friction optimised rear axle differential; and engine covering/underbody panelling. 2002 also saw the increased application of: GDI, alternative-fuelled vehicles, VVT, 6-speed & automated manual gearboxes, electric power steering, lightweight materials, refined aerodynamics, rolling resistance improvements, and turbo-charged engines.

These advances reflect significant and continued efforts by ACEA manufacturers to introduce a wide range of technical and product developments to reduce CO₂ emissions. According to ACEA the large-scale commercialisation of CO₂ efficient technologies has brought to market new cars with attractive product attributes that have then induced market changes (such as diesel share growth following the launch of DI diesels etc.).
In 2002, ACEA reduced the average CO₂ emissions of its new car fleet. Taking the official EU data, the average specific emissions of ACEA's new car fleet registered in the EU was 165 g/km. ACEA's CO₂ performance is consistent with achieving the 2003 estimated intermediate target range of 165 -170 g/km specified in its Commitment. ACEA has already met the first of its CO₂ commitments ("some members of ACEA will introduce in the EU market, not later than 2000, models emitting 120 gCO₂/km or less"). In fact, 2002 saw new registrations of cars emitting 120 gCO₂/km or less rise sharply (even though car registrations in total fell by over 4 %¹¹). The share of cars emitting 140 gCO₂/km or less also rose in 2002, further evidencing ACEA's determination to meet its commitments.

To meet its 2008 Commitment ACEA must increase its annual average reduction rate to about 4 g/km or 2.5 % a year during the remaining period of the Commitment. Based on ACEA's time-series data, to meet its 2008 Commitment ACEA must increase its annual average reduction rate to 2.3 % a year during the remaining period of the Commitment, from about 3 g/km or 1.7 % average annual decrease achieved since 1995. However, it should be noted that using ACEA's 1995-2002 data set, CO₂ emissions have been cut from 185 g/km in 1995 to 163 g/km in 2002. Over recent years CO₂ reduction rates have been higher than expected -- with diesel technology especially, being extremely well accepted in the EU market. The overall outcome is that in 2002 ACEA was almost half the way towards achieving its 2008 target.

ACEA stresses that compliance with the 2008 target remains extremely ambitious, both technically and economically.

In summary, the Commission Services and ACEA have no reason to believe that ACEA will not live up to its Commitment.

¹¹ Based on ACEA data.
1. MONITORING OF TECHNOLOGICAL DEVELOPMENTS AFFECTING THE COMMITMENT

1.1. Commitment initiatives

| 1.1.1. Brief description of current R&D programmes |
| 1.1.2. Other |

The ACEA Commitment continues to ensure that right across the European automotive industry, CO2 reduction remains a high priority in R&D expenditures, as well as in product and process planning and development. The vast majority of this R&D effort is being undertaken independently, by each of the ACEA manufacturers freely pursuing their own policies and initiatives in this highly competitive area. It is not possible, for competitive reasons, to review individual manufacturer R&D programmes as part of the monitoring report.

In addition, however, ACEA and its sister body EUCAR are undertaking a collaborative, pre-competitive automotive R&D programme on medium and long-term technologies for CO2 reduction (as detailed in previous Joint Monitoring Reports). It seeks to use "Framework Programme" (FP) funding to launch collaborative projects between manufacturers, suppliers, research institutes and universities. The programme reflects the research interests of the participating companies, and serves to illustrate key areas of R&D activity. For the upcoming FP6, EUCAR has arranged its research into three areas: Fuels & Powertrain; Manufacturing & Materials; and Integrated Safety - and the first two cover CO2 reduction topics:

Fuels & Powertrain: integrated project proposals are being prepared on renewable (biomass) fuels, improved conventional powertrains, fuel cell powertrains and auxiliary power units, hydrogen storage.

Manufacturing & Material: integrated project proposals are being prepared for low weight vehicles using a mixed material approach, as well as methods and concepts on how vehicles are to be manufactured efficiently and environmentally sound in the future.

Section 4.5 provides a fuller summary of EUCAR's research activities.

1.2. Technological developments

| 1.2.1. Description of fuel efficiency characteristics of new technologies, alternative concepts |
| 1.2.2. Availability of new technologies in the EU |
| 1.2.3. Availability of alternative concepts passenger cars in the EU |
| 1.2.4. Availability of low emission passenger cars (e.g. emitting 120 g/km or less) in the EU |

Technical developments introduced by one or more ACEA manufacturers in 2002 included:

- fully variable valve lift & timing technology combined with GDI;

- variable intake control system on small gasoline engines (this employs a variable intake manifold in combination with a high rate of exhaust gas recirculation);

- fast warm-up cooling systems to reduce internal engine friction in warm-up;
• torque converter lock-up from 1st gear on automatic transmissions;
• application of low-viscosity/friction oil (engine and rear axle) across model-ranges;
• friction optimised rear axle differential;
• engine covering/underbody panelling; and 2002 also saw the increased application of: GDI, VVT, 6-speed & automated manual gearboxes, electric power steering, lightweight materials; refined aerodynamics; rolling resistance improvements (through better tyres &brakes), and turbo-charged engines.

In addition ACEA manufacturers continued their on-going development of alternative-fuelled vehicle technologies (CNG/LPG/bioethanol/biogas/electric/etc.), and 2002 saw a growth in sales of alternative-fuelled vehicles (AFVs).

These advances reflect significant and continued efforts by ACEA manufacturers to introduce a wide range of technical and product developments to reduce CO2 emissions. According to ACEA the large-scale commercialisation of CO2 efficient technologies has brought to market new cars with attractive product attributes that have then induced market changes (such as diesel share growth following the launch of DI diesels etc.).

Technical advances by ACEA manufacturers resulted in a continued upward trend in the market share taken by the most fuel-efficient cars. In 2002, based on ACEA data, ACEA first registrations of (petrol + diesel) cars with CO2 levels of 140 g or less, rose to 23.7 % of total registrations --up from a 23.0 % share in 2001 and a 2.6 % share in 1995. Further, ACEA continued to build on its Year 2000 achievement of the first of its CO2 commitments: "some members of ACEA will introduce in the EU market models emitting 120 gCO2/km or less". 2002 saw first registrations of cars emitting 120 gCO2/km or less rise by over 90 % on the prior year (even though car registrations in total dropped by over 4 %); first registrations of such cars totalled over 580 000 units, and they achieved an impressive 5 % share of new registrations, compared to only 0.7 % as recently as 1999. This technology driven trend to fuel-efficient cars directly connects to the provision in the ACEA Commitment on achieving the target mainly "by technological developments -- and market changes linked to these developments".

1.3. Description of market trends in physical fleet characteristics

Through its technical developments (see Section 1.2), ACEA has achieved sizeable improvements in new car CO2 performance whilst increases in other physical fleet characteristics have occurred. Overall figures for average car mass, engine capacity and power increased in 2002, compared to 2001. However, based on ACEA's time-series data, some car characteristics decreased in 2002 compared to earlier periods; for example, petrol car mass (down on 1999) and diesel engine capacity (down on 1996). Reduction of diesel engine capacities can mainly be attributed to direct injection technology, which has allowed lowering engine capacities.

ACEA provided some indication that new automotive regulations, introduced since 1995, have added to car mass, and therefore damaged fuel efficiency (see Section 4.2 of 2001 Joint Monitoring Report, for ACEA's estimate of adverse CO2 effects). However an in-depth analysis of the impact of new regulations needs still to be undertaken.
The Commission believes that the increases in vehicle weight that might have been as an effect of new legislation are, if at all, potentially small and would therefore be negligible for the average specific CO\textsubscript{2} emissions


2.1. Trends in specific emissions of CO\textsubscript{2} (g/km)

In 2002, taking the official EU data, the average specific emissions of ACEA's new car fleet registered in the EU was 165 g/km.

Compared to ACEA's 2001 data, ACEA reduced the average specific CO\textsubscript{2} emissions of its new car fleet registered within the EU by about 2 g/km; a reduction of 1.2 \%\textsuperscript{12,13}. This is about the same reduction rate when official 2002 EU data are compared with unofficial 2001 EU data\textsuperscript{14}.

Since 1995, ACEA has maintained an unbroken trend of CO\textsubscript{2} emission reduction. Using ACEA's 1995 time-series between 1995 and 2002, ACEA achieved an overall reduction in new car CO\textsubscript{2} emissions of 12.1 \%; petrol cars were down by 9.0 \%, and diesel cars were down by 13.6 \% (see Figure 3).

![Figure 3: ACEA's CO\textsubscript{2} Reduction Index (1995=100); based on ACEA data. For 2002 official EU data are added. 2001 and 2002 data are corrected by 0.7 \% for cycle change adjustment](image)

\textsuperscript{12} ACEA data used for 1995 since no official EU data exists for the period since 1995. The EU data is the official basis for the monitoring process. However, since EU and ACEA data are not fully consistent and comparable in all details, for trend analysis ACEA's 1995-2002 data are used. For this reason no percentage calculations using ACEA's 1995 data and EU 2002 data are shown in this report.

\textsuperscript{13} All percentage figures are based on unrounded numbers.

\textsuperscript{14} See COM(2002)693 final. Please note that the official EU data cover alternative fuels, ACEA data does not. However, in the light of the small number of alternative fuel vehicles registered this has no impact on the reported EU averages.
2.2. Number of newly registered passenger cars

In 2002, ACEA new car registrations in the EU amounted to 12 044 461 units, using ACEA data, down over 4 % on the previous year\(^{15}\). ACEA’s market share of total EU passenger cars was 86 % (including Rover\(^{16}\)). Over the period 1995-2002 new registrations increased by 17.6 %.

Petrol car registrations totalled 6 481 940 units in 2002, an 11.3 % decrease on the previous year. In 2002, such vehicles represented 53.8 % of total new car registrations by ACEA members. The number of diesel cars registered totalled 5 252 613 in 2002, which represented 43.6 % of total car registrations by ACEA members (see Figure 4). The number of cars equipped with other fuel types (AFVs) increased in 2002 (see Section 2.5).

Figure 4: New Car Registrations by ACEA (million units)

2.3. Fleet composition

Figure 5 shows ACEA's fleet composition by CO\(_2\) categories for the year 2002, and the reference year 1995 (using ACEA data).

\(^{15}\) All figures given in this chapter are based on ACEA data.

\(^{16}\) See Section 2.12
In 2002, ACEA's CO₂-related fleet composition continued to show a strong move towards more fuel-efficient cars, with 140 g or below cars achieving a 23.7 % share of total (petrol + diesel) registrations in 2002 -- up from 6.8 % in 1998, and only 2.6 % in 1995 (see Figure 6). Over the 1995 to 2002 period new registrations of such cars has been multiplied by almost 10. By contrast, in 2002, there were sizeable falls in both the registrations and market share of cars with CO₂ emissions of more than 160 g/km. Registrations of these cars fell by almost 8 % in 2002 on the prior year, and by over 40 % compared to 1995; as a proportion of total ACEA registrations, such cars decreased from 80.8 % in 1995, to 64.9 % in 1998 to reach 40.9 % in 2002.

Figure 7 shows how ACEA shares of registrations have developed by CO₂ category over the 1995-2002 period. As can be seen, ACEA achieved a clearly identifiable "wave-effect" towards enhanced new car fuel efficiency.
2.4. EU trends in physical fleet characteristics

Trends in physical characteristics of ACEA's new car fleet are shown in Figure 8 below (see also Section 1.3).

Using ACEA time-series data, average car mass (petrol + diesel) rose in 2002, and since 1995 a 10.2% increase in mass has occurred. For petrol cars, there was virtually no growth in mass, and compared to 1999, petrol car mass was down by 1%. In 2002, diesel car mass maintained its recent upward trend.

Engine capacity for petrol and diesel combined increased very slightly in 2002; and over the 1995 to 2002 period has only shown a growth of 5.7%. In 2002, petrol capacity rose marginally, and since 1995 has risen by only 1.6%. Diesel capacity fell in 2002; this 2002 level is below that in 1996.
Engine power (petrol + diesel) rose in 2002, and since 1995, quite a strong increase has occurred, driven particularly by increased diesel power.

Through its technical developments (see Section 1.2), ACEA has achieved sizeable improvements in new car CO\textsubscript{2} performance whilst increases in other physical fleet characteristics have occurred.

### 2.5. Trends in new technologies in the EU

As noted in Sections 1.2, 2002 saw the introduction or increased application by ACEA manufacturers of a wide range of technical developments to reduce CO\textsubscript{2} emissions. Within these reduction efforts, ACEA manufacturers continued their on-going development of alternative-fuelled vehicle technologies (CNG/LPG/bioethanol/biogas/electric/etc.), and 2002 saw a growth in sales of alternative-fuelled vehicles (AFVs). See Figure 9 for AFV sales developments since 1995, based on ACEA data.

![Figure 9: ACEA sales of Alternative-Fuelled Vehicles (units)](image)

### 2.6. Trends in low emission passenger cars in the EU

In 2002 ACEA built further on its Year 2000 achievement of the first of its CO\textsubscript{2} commitments ("some members of ACEA will introduce in the EU market models emitting 120 gCO\textsubscript{2}/km or less"). Using ACEA time-series data, in 2002 ACEA first registrations of 120 gCO\textsubscript{2}/km or less cars rose by over 90 % on the prior year (even though car registrations in total dropped by over 4 %). In 2000, ACEA manufacturers achieved this commitment, by bringing to market more than 20 models that achieved 120 gCO\textsubscript{2}/km or less - with registrations of almost 160 000 units. This major effort was augmented in 2001 with ACEA manufacturer first registrations of such cars totalling over 306 500 units -- which represented over 2.5 % of total ACEA (petrol + diesel) registrations. In 2002, first registrations of cars emitting 120 gCO\textsubscript{2}/km or less again almost doubled to reach over 580 000 units (see Figure 10 for longer-term developments), and achieved an impressive 5 % share of total new registrations.
2.7. Trends in alternative concepts passenger cars in the EU

Nothing new to report.

2.8. Trends in innovative concepts passenger cars in the EU

In 2002 the car manufacturers' associations and the Commission agreed guidelines for the acceptance of innovative concepts within the monitoring of the commitments (see Annex 3).

2.9. Brief description of the degree of occurrence of grey areas between M1 and N1 vehicles

Nothing to report (see Section 2.10).

2.10. Data sources, data methods and data confidence levels

For the first time since the inception of the Joint CO₂ Monitoring Reports, this 2002 report utilises data from the official EU scheme (1753/2000/EC), that is based on Member State submissions (see Annex 1). The data submitted by Member States are now the official basis for the monitoring process. The data have been slightly processed by the Commission. Until now, ACEA purchased data from the French-based association AAA (Association Auxiliaire de l'Automobile), so as to enable the annual monitoring exercises to be undertaken.

However, with official EU data becoming available, a discontinuity from the past data series exists, because of underlying differences (see below). It is not correct to simply adjoin official data for the most recent year, onto ACEA's historical data.

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17 The cycle change correction of 0.7% has been applied, and potentially erroneous allocations of vehicles to CO₂ classes, involving a few hundred vehicles, have been suppressed (see Annex 1)
The main dimensions of this discontinuity are:

**Country Coverage:** The EU data for 2002 covers all 15 Member States. Whereas, ACEA's CO₂ data has never included Greece, and has not until recently included Finland (due to data unavailability).

**Methodology Differences:** ACEA data links registrations to one, highly analysed, vehicle specification information bank, which is used for all Member State registrations. For EU data, each Member State has its own vehicle specification set, to which it links its national registrations; national variations in these vehicle specifications exist. A number of more specific methodological issues have been identified in relation to CO₂ categories and the treatment of unknown cars (see next item on Registration Differences), e.g. ACEA's data provider closes gaps in incomplete data sets with the help of its databank while Member States count only cars with complete data sets. In order to improve the data a more in-depth analysis would be needed. Moreover there seems to be a systematic difference in the reporting of the mass of vehicles between ACEA data (report mass of empty vehicle) and Member States data (report in accordance with the definition given in Decision 1753/2000/EC).

**Registration Data Differences:** The official EU data seems to miss a sizeable percentage of new car registrations. In 2002, the difference is about 400 000 vehicles (equal to about 3 % of total registrations). The largest difference was in Spain. The official EU data only record registrations (and CO₂ figures) for which CO₂ data is provided whereas in the case of ACEA data, if no CO₂ information was available, or cannot be provided by the vehicle specification data bank, any such vehicles would be included under an "unknown" category. In past Monitoring Reports the size of "unknown versions" has been an important parameter in the evaluation of data quality. The EU data cannot provide this information.

**Grey Area Problem:** ACEA believes that some Member States might register vehicles in accordance with the fiscal regime (commercial or private vehicle), not in accordance with M1 & N1 category definitions. This is a likely source of difference, which needs more thorough investigation -- particularly the number of M1 vehicles potentially registered as N1. As shown in an earlier report, for ACEA data, the grey area issue is small; for EU data it is an unknown volume.

**Data Scope:** The official EU data covers - as laid down in the Commitment - the CO₂ emissions of cars using all fuels, including AFVs. Whereas ACEA's CO₂ data has consistently been on the basis of petrol + diesel cars.

ACEA is closely monitoring data quality of this newly available EU data source. Currently the variance between EU & ACEA data in terms of the overall average CO₂ figure is only a little more than 1%; although differences in some details exist, over the long-term data differences should narrow. ACEA explained that for the future it will continue to make data comparisons between EU/Member State and industry data sources, and if over the next years

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18 It should be noted that the Commission believes that such a difference does not automatically lead to differences in the calculated CO₂ averages. This would be only the case if the characteristics of the missing data deviate systematically from the characteristics of the total fleet. The issue will be further discussed within the Expert Group dealing with the implementation of Decision 1753/2000/EC.

19 It should be mentioned that the number of AFV was so small in the past, and still is, and that the Commission therefore believes that these vehicles are negligible for the calculated CO₂ average.
systematic deviations become apparent, ACEA will assume that systematic deviations also existed in the baseline assumption for year 1995.

Since actual and underlying methodological differences exist between the EU data and ACEA's data (see above and Annex 2) the new EU data cannot be simply adjoined onto ACEA's historical CO\textsubscript{2} time-series built-up from 1995. As a result, the new data does not provide a means to undertake longer-term "trend" evaluations of key CO\textsubscript{2} developments that can contribute to a better understanding of CO\textsubscript{2} reduction developments. For this reason this Joint Report uses ACEA's consistent historical data through to 2002 for such evaluations.

### 2.11. Description of measurement issues for CO\textsubscript{2} emission factors

The ACEA Commitment specifies that new car CO\textsubscript{2} emissions will be measured according to Directive 93/116/EC. Since the establishment of the ACEA Commitment, the mandatory type approval method of measuring CO\textsubscript{2} emissions has been revised by Directive 99/100/EC. One of the principle changes (introduced over the period 2000 to 2002 for M1 vehicles) relates to the drive cycle - the deletion of the initial 40 seconds of unmeasured engine idling prior to the commencement of the test. As a rule, such a change of test procedure increases the measured value of CO\textsubscript{2} emissions.

Since January 2001 almost all new M1 vehicles have had their CO\textsubscript{2} emissions measured according to the "new" directive/cycle (99/100/EC). A correction factor needs to be applied to the measured CO\textsubscript{2} emissions of such vehicles to broadly bring them into line with the 93/116/EC procedure, which is the basis on which ACEA's future targets were established and the basis of historical monitoring data in this report. In 2002 ACEA & the Commission reached a consensus on this correction factor adjustment; it was agreed that a 0.7 % reduction should be applied to "measured" emissions to align them with the Commitment's basis. In this report, this adjustment has been applied to 2001 and 2002 data. For future years it was also agreed that this 0.7 % adjustment should be maintained unless new data is provided by ACEA, that proves its inappropriateness.

### 2.12. Other issues

As stated in the 2001 Monitoring Report, Rover is no longer a member of ACEA. Although Rover terminated its ACEA membership from 2001, to maintain consistency with prior years, when Rover was a member, figures on ACEA, contained in this report, continue to include Rover. The procedure is acceptable to ACEA and Rover. ACEA explained that this does not imply, however, that ACEA now takes any responsibility for Rover's CO\textsubscript{2} performance; historical data consistency is the sole reason for the continued inclusion of Rover data in ACEA's figures.

According to ACEA's data in 2002 Rover car registrations only accounted for 1.2 % of the ACEA total. ACEA's total CO\textsubscript{2} figure for 2002 would have been about 0.1 g/km lower if Rover were excluded from the ACEA total. The impact on the 1995 data has not been assessed yet.

The Commission is continuing to examine Rover's exit from ACEA, in relation to the CO\textsubscript{2} Commitment.
3. KEY ASSUMPTIONS TO THE COMMITMENT

3.1. Availability of enabling fuels
Statement on implication for the Commitment and justification

3.2. Nothing new to report. Distortion of competition
Statement on implication for the Commitment and justification

Nothing new to report.

3.3. Promotion of CO₂ efficient technologies
Statement on implication for the Commitment and justification

In prior monitoring reports ACEA raised concerns over UK diesel policies that have restricted CO₂ reduction potential over a period through to 2001. In October 2002 ACEA provided the Commission with additional information on UK diesel disincentive policies and diesel's weak performance in the UK market compared to the rest of the EU market. In its reply in May 2003 concerning the taxation of diesel passenger cars in the United Kingdom, the Commission provided results of an independent study that shows that the recent changes in UK's taxation policy favour the purchase of diesel vehicles. This has been confirmed by the UK Government, which drew attention to the increasing trend in diesel share between 2000 and 2002. The Commission and ACEA agree that this issue will again be addressed in the "2003 Review" of the ACEA Commitment.

3.4. Acceptance of innovation
Statement on implication for the Commitment and justification

Nothing new to report.

4. OTHER ISSUES

4.1. New measures affecting CO₂
Comment on impact of the issue and on implication for the Commitment

Nothing new to report.

4.2. New regulatory measures
Comment on impact of the issue and on implication for the Commitment

ACEA continues to consider that the End of Life (ELV) Directive has adverse implications for fuel efficiency. ACEA disagrees with the Commission's assessment (see 2001 Joint Report) that this Directive "will not have any adverse effect on fuel efficiency given it does not limit the use of any material". As expressed in previous reports the Commission sees no evidence for adverse effects.

4.3. Fiscal measures
Comment on impact of the issue and on implication for the Commitment

Nothing further to report (see Section 3.3).

4.4. Breakthrough technologies
Comment on impact of the issue and on implication for the Commitment

Nothing further to report (see Sections 1.1, 1.2 & 4.5).
### 4.5. Research Programmes: Description and future potential

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In 2002 the final phase of FP5 was being reached, along with preparations for the start-up of the next EU Framework Programme -- FP6. This meant that during 2002 there were no submission of proposals for new research projects, as FP5 have had no calls (of EUCAR relevance) in the later period.

Instead efforts were placed on launching proposals accepted during the 2001 calls -- such as FUEVA (fuel cell technologies validation), and FPEC (piston movement to electric conversion), as reported in the 2001 report. Also, for those proposals accepted in the earlier phase of FP5, and expected to be completed during 2003, efforts were being placed on delivering what has been agreed. Further, initial ideas on how to evaluate the results of the FP5 powertrain related projects were elaborated. The Commission funded Thematic Network on Powertrain, PREMTECH, will play an important role in this evaluation which is expected to start in 2003.

The European industry has always indicated that CO₂ research issues need to be addressed by a long-term programme, and consequently has stressed the need to have CO₂ emission reduction research issues sufficiently covered and funded in both FP5 and FP6. During 2002, FP6 has therefore been of great interest and concern to EUCAR and its members. The initial proposal on FP6, to a too great extent, neglected road transport and CO₂ emission reduction research; however, this was corrected for the final version, and FP6 now offers a level of CO₂ research possibilities comparable to that in FP5.

During 2002 initial ideas on FP6 projects were matured into draft Integrated Project (IP) proposals which are to be submitted to the first calls of FP6, deadline March – April 2003. The Integrated Project form of running research projects, as FP6 offers, allows larger and more system oriented research, (budget range 10 – 30 M Euro, duration 4 – 6 years).

For FP6, EUCAR has arranged its research into three programmes; Fuels & Powertrain, Manufacturing & Materials and Integrated Safety. Each will be mentored by one or two research directors coming from the EUCAR Council members; the idea behind forming these three programmes is to direct the research towards the relevant issues and to harmonise industrial and research strategies.

Clearly the first two groups cover topics dealing with CO₂ reduction. In the Fuels & Powertrain program, IP proposals are being prepared on renewable (biomass) fuels, improved conventional powertrains, fuel cell powertrains and auxiliary power units, hydrogen storage. In the second program, Manufacturing & Material, IP proposals are being prepared for low weight vehicles using a mixed material approach, as well as methods and concepts on how the future vehicles are to be manufactured efficiently and environmentally sound. In mid-2003 indications are expected on which of these IP proposals will be accepted for FP6 funding.
4.6. **Other measures - telematics, infrastructure, education**

Comment on impact of the issue and on implication for the Commitment

Nothing new to report.

4.7. **Economic situation of the car industry**

Comment on impact of the issue and on implication for the Commitment

ACEA is of the opinion that the EU economic growth in 2002 was very disappointing and well below potential. A range of global and EU-level uncertainties had a negative impact on domestic demand and consumer & investor confidence. ACEA explained that against this poor macro-economic environment car sales deteriorated in 2002, despite the provision of sales incentives by manufacturers. ACEA new car registrations in the EU fell by over 4% in 2002 on 2001 (based on ACEA data) (see Section 2.2).

ACEA believes that the tough economic and financial environment has slowed the uptake of more advanced (and typically more expensive) technologies into the marketplace.

The Commitment requires that "...any detrimental impacts on the financial performance, competitiveness and employment with the European industry associated with the Commitment will be reviewed". Nevertheless, the Commission agrees that the general economic growth in the EU in 2002 was depressed. A fragile economy especially in some of Europe's larger economies, and political instability following September 11 has contributed to a more cautious outlook among consumers overall. Even a short-term reduction in demand, as in 2002, can be a cause for concern in the auto industry. The cost for launching a new model is high and as it will only have a relatively short life span each model is dependent on a certain uptake. This coupled with a certain over capacity in the sector can give industry concerns. It is worth noting, however, that the slowdown in 2002 comes after a number of years with historically high sales figures.

It was agreed that the issue will be re-addressed within the "Review in 2003" mentioned in the Technical Annex to the Commitment.

5. **CONCLUSIONS**

5.1. **Progress statement on delivering the Commitment**

Since 1995, ACEA has maintained an unbroken trend of CO₂ emission reduction. In 2002 - taking the official EU data - the average specific emissions of ACEA's new car fleet registered in the EU is 165 g/km. ACEA's CO₂ performance is well ahead of what is needed to achieve the 2003 estimated intermediate target range of 165 -170 g/km specified in its Commitment, and ACEA has already met the first of its CO₂ commitments ("some members of ACEA will introduce in the EU market, not later than 2000, models emitting 120 gCO₂/km or less"). In fact, 2002 saw registrations of cars emitting 120 gCO₂/km or less rise sharply (even though car registrations in total fell). The share of cars emitting 140 gCO₂/km or less also rose in 2002, further evidencing ACEA's determination to meet its commitments.

---

20 For the first time, official EU data is used in this Joint Monitoring Report. According to the Joint Monitoring System the monitoring has to be based on the data delivered under Decision 1753/2000/EC. According to this scheme prior 1995-2001 monitoring was based on data provided by ACEA. The Annex contains comparisons of data from EU and ACEA sources, whenever appropriate.
Further in 2002, ACEA was almost half the way towards achieving its 2008 target and CO₂ reduction rates have been higher than expected. To meet its 2008 Commitment ACEA must increase its annual average reduction rate to about 4 g/km or 2.5 % a year during the remaining period of the Commitment. Based on ACEA's time-series data, to meet its 2008 Commitment ACEA must increase its annual average reduction rate to 2.3 % a year during the remaining period of the Commitment, from about 3 g/km or 1.7 % average annual decrease achieved since 1995. Over recent years diesel technology, especially, has been extremely well accepted in the EU market.

ACEA stresses that the 2008 target remains extremely ambitious, both technically and economically.

In summary, the Commission Services and ACEA have no reason to believe that ACEA will not live up to its Commitment.
DATA ANNEXES (2002)

ANNEX 1:
A1: SPECIFIC FUEL EFFICIENCY (l/100km) AND EMISSIONS OF CO₂ (g/km) AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE, FOR THE EU AND EACH MEMBER STATE

A2: THE DISTRIBUTION OF CO₂ EMISSIONS (g/km) IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

A3: THE DISTRIBUTION OF AVERAGED POWER AND ENGINE CAPACITY OF NEW PASSENGER CARS FOR EACH FUEL TYPE FOR THE EU-15 AND EACH MEMBER STATE

ANNEX 2: KEY DAT COMPARISON

ANNEX 3: MONITORING RULES FOR INNOVATIVE CONCEPTS
ANNEX 1: 2002 Monitoring Data

A1: SPECIFIC FUEL EFFICIENCY (l/100km) AND EMISSIONS OF CO₂ (g/km)\(^{21}\) AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE FOR THE EU AND EACH MEMBER STATE\(^{22}\)

ACEA MEMBERS - 2002

<table>
<thead>
<tr>
<th>Member State</th>
<th>All fuels</th>
<th>Petrol</th>
<th>Diesel</th>
<th>Petrol + Diesel</th>
<th>AFV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Average CO₂</td>
<td>Number</td>
<td>Average fuel</td>
<td>Average CO₂</td>
</tr>
<tr>
<td>EU -15</td>
<td>11 647 580</td>
<td>165</td>
<td>6 557 754</td>
<td>7.3</td>
<td>172</td>
</tr>
<tr>
<td>A</td>
<td>229 338</td>
<td>160</td>
<td>61 299</td>
<td>7.2</td>
<td>171</td>
</tr>
<tr>
<td>B</td>
<td>407 470</td>
<td>158</td>
<td>130 460</td>
<td>7.1</td>
<td>168</td>
</tr>
<tr>
<td>DK</td>
<td>86 310</td>
<td>169</td>
<td>66 714</td>
<td>7.5</td>
<td>177</td>
</tr>
<tr>
<td>F</td>
<td>1 965 394</td>
<td>154</td>
<td>716 996</td>
<td>6.9</td>
<td>164</td>
</tr>
<tr>
<td>FIN</td>
<td>80 637</td>
<td>178</td>
<td>67 047</td>
<td>7.7</td>
<td>182</td>
</tr>
<tr>
<td>GER</td>
<td>2 747 797</td>
<td>175</td>
<td>1 626 966</td>
<td>7.7</td>
<td>182</td>
</tr>
<tr>
<td>GR</td>
<td>156 696</td>
<td>166</td>
<td>156 150</td>
<td>7.0</td>
<td>166</td>
</tr>
<tr>
<td>IRE</td>
<td>103 311</td>
<td>162</td>
<td>82 682</td>
<td>6.9</td>
<td>163</td>
</tr>
<tr>
<td>IT</td>
<td>1 962 683</td>
<td>154</td>
<td>1 085 159</td>
<td>6.5</td>
<td>155</td>
</tr>
<tr>
<td>LUX</td>
<td>38 283</td>
<td>171</td>
<td>13 667</td>
<td>8.1</td>
<td>191</td>
</tr>
<tr>
<td>NL</td>
<td>400 239</td>
<td>172</td>
<td>298 697</td>
<td>7.4</td>
<td>176</td>
</tr>
<tr>
<td>POR</td>
<td>196 590</td>
<td>152</td>
<td>120 870</td>
<td>6.5</td>
<td>154</td>
</tr>
<tr>
<td>SP</td>
<td>909 015</td>
<td>153</td>
<td>359 772</td>
<td>7.0</td>
<td>166</td>
</tr>
<tr>
<td>SW</td>
<td>207 024</td>
<td>198</td>
<td>190 420</td>
<td>8.4</td>
<td>199</td>
</tr>
<tr>
<td>UK</td>
<td>2 156 796</td>
<td>172</td>
<td>1 580 855</td>
<td>7.5</td>
<td>177</td>
</tr>
</tbody>
</table>

\(^{21}\) The emission-values of CO₂ are corrected by 0.7%.

\(^{22}\) The total number of vehicles based on the data from Member States is smaller than the total number of vehicles according to the data of the car manufacturers association because the Member States submit exclusively data about those vehicles for which corresponding CO₂ data are available in their database.
**A2: THE DISTRIBUTION OF CO₂ EMISSIONS**\(^{23}\) (g/km) IN THE NEW PASSENGER CAR FLEET\(^{24}\) FOR EACH DIFFERENT FUEL TYPE\(^{25}\)

**ACEA MEMBERS - 2002**

<table>
<thead>
<tr>
<th>CO₂ Category</th>
<th>All fuels</th>
<th>Petrol</th>
<th>Diesel</th>
<th>Petrol + Diesel</th>
<th>AFV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Average CO₂</td>
<td>Number</td>
<td>Average CO₂</td>
<td>Number</td>
</tr>
<tr>
<td>&lt;60</td>
<td>52</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60-80</td>
<td>6 521</td>
<td>80</td>
<td>0</td>
<td>0</td>
<td>6521(^{27})</td>
</tr>
<tr>
<td>81-100</td>
<td>28 660</td>
<td>90(^{28})</td>
<td>2 863</td>
<td>95</td>
<td>25 797</td>
</tr>
<tr>
<td>101-120</td>
<td>498 051</td>
<td>115</td>
<td>65 021</td>
<td>117</td>
<td>432 559</td>
</tr>
<tr>
<td>121-140</td>
<td>1 871 582</td>
<td>136</td>
<td>775 929</td>
<td>137</td>
<td>1 095 312</td>
</tr>
<tr>
<td>141-160</td>
<td>3 919 565</td>
<td>150</td>
<td>1 894 849</td>
<td>150</td>
<td>2 020 686</td>
</tr>
<tr>
<td>161-180</td>
<td>2 566 525</td>
<td>170</td>
<td>1 859 598</td>
<td>169</td>
<td>702 192</td>
</tr>
<tr>
<td>181-200</td>
<td>1 234 741</td>
<td>190</td>
<td>880 542</td>
<td>190</td>
<td>353 300</td>
</tr>
<tr>
<td>201-250</td>
<td>1 184 441</td>
<td>222</td>
<td>834 299</td>
<td>222</td>
<td>344 771</td>
</tr>
<tr>
<td>251-300</td>
<td>253 988</td>
<td>270</td>
<td>164 528</td>
<td>271</td>
<td>89 451</td>
</tr>
<tr>
<td>301-350</td>
<td>61 345</td>
<td>320</td>
<td>59 452</td>
<td>319</td>
<td>1 891</td>
</tr>
<tr>
<td>351-450</td>
<td>18 357</td>
<td>386</td>
<td>18 355</td>
<td>386</td>
<td>0</td>
</tr>
<tr>
<td>&gt;450</td>
<td>1 123</td>
<td>495</td>
<td>1 123</td>
<td>495</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^{23}\) It is generally not possible to adjust the official EU CO₂ category distribution data for the 0.7 % cycle change. If such an adjustment were feasible, the effect would be for volumes to move into lower categories (e.g. 140 g & less cars would increase in volume as a % of total). However, on request of ACEA it was taken into account that each of two ACEA members respectively is producing one variant of a model which is emitting 81 gCO₂/km. After adjusting this value to the new test cycle (-0.7 %) the value will be 80.4 gCO₂/km. This adjustment is done in this table only for these two variants. All other vehicles, car makes and CO₂ emission categories are not adjusted.

\(^{24}\) The following vehicles were suppressed due to possible data implausibility: 290 petrol cars with 14 gCO₂/km as an average from the category <60 gCO₂/km, 16 diesel cars with 16 gCO₂/km as an average from the category <60 gCO₂/km, 144 petrol cars with 79 gCO₂/km as an average from the category 60-80 gCO₂/km, 50 diesel cars with 79 gCO₂/km as an average from the category 60-80 gCO₂/km, 502 diesel vehicles emitting 414 gCO₂/km as an average from the category 351-450 gCO₂/km, 7 vehicles emitting 775 gCO₂/km as an average from the category >450 gCO₂/km.

\(^{25}\) The total number of vehicles based on the data from Member States is smaller than the total number of vehicles according to the data of the car manufacturers association because the Member States submit exclusively data about those vehicles for which corresponding CO₂ data are available in their data base.

\(^{26}\) Electric vehicles. ACEA believes that the number of vehicles mentioned is not accurate.

\(^{27}\) Two variants of models of ACEA Members are currently on the market which are emitting 81 gCO₂/km. No other model or variant is offered in the category of 81-100 gCO₂/km by ACEA Members. Thus for test cycle adjustment (see footnote 23) all vehicles of these two car makes were shifted from category 81-100 gCO₂/km into the category 60-80 gCO₂/km.

\(^{28}\) Not re-calculated after shift of “81 g vehicles” (see footnote 27)

\(^{29}\) Not re-calculated after shift of “81 g vehicles” (see footnote 27)

\(^{30}\) Not re-calculated after shift of “81 g vehicles” (see footnote 27)
### A3 The Distribution of Averaged Power and Engine Capacity of New Passenger Cars for Each Fuel Type for the EU-15 and Each Member State\(^{31}\)

ACEA Members - 2002

<table>
<thead>
<tr>
<th>Member State</th>
<th>Power [kW]</th>
<th>Capacity [cm³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Petrol</td>
</tr>
<tr>
<td>EU-15</td>
<td>78</td>
<td>75</td>
</tr>
<tr>
<td>DK</td>
<td>79</td>
<td>81</td>
</tr>
<tr>
<td>F</td>
<td>73</td>
<td>70</td>
</tr>
<tr>
<td>IRE</td>
<td>77</td>
<td>75</td>
</tr>
<tr>
<td>NL</td>
<td>78</td>
<td>77</td>
</tr>
<tr>
<td>POR</td>
<td>66</td>
<td>58</td>
</tr>
</tbody>
</table>
| SW           | 103   | 103    | 100    | 103    | 101 | 1993  | 1979  | 2130  | 1991     | 2435\n| UK           | 88    | 87     | 91     | 88     | 84  | 1738  | 1650  | 1978  | 1738     | 1806\n
\(^{31}\) Mass data not shown due to possible inconstancies in Member States’ deliveries
ANNEX 2: Key Data Comparison

EU 2002 & ACEA 2001 and 2002 key data

(All data in CO₂ emissions section corrected by 0.7 % for cycle change)

<table>
<thead>
<tr>
<th>CO₂ emissions (CO₂/g/km)</th>
<th>Difference between ACEA and EU data</th>
<th>EU data: 2002</th>
<th>ACEA data: 2001</th>
<th>ACEA data: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol + Diesel</td>
<td>1.2%</td>
<td>165g</td>
<td>165g</td>
<td>163g</td>
</tr>
<tr>
<td>Petrol</td>
<td>0.5%</td>
<td>172g</td>
<td>172g</td>
<td>171g</td>
</tr>
<tr>
<td>Diesel</td>
<td>1.7%</td>
<td>155g</td>
<td>153g</td>
<td>152g</td>
</tr>
</tbody>
</table>

| Total Car Registrations (million units) | 3.5% | 11.6 | 12.6 | 12.0 |

Distribution of CO₂ emissions by CO₂ category (% share of petrol + diesel registrations)³²:

<table>
<thead>
<tr>
<th>CO₂ Category</th>
<th>EU 2002</th>
<th>ACEA 2001</th>
<th>ACEA 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>120g &amp; less</td>
<td>4.6%</td>
<td>2.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>121-140g</td>
<td>16.1%</td>
<td>20.5%</td>
<td>18.7%</td>
</tr>
<tr>
<td>141-160g</td>
<td>33.7%</td>
<td>34.5%</td>
<td>35.5%</td>
</tr>
<tr>
<td>161-180g</td>
<td>22.0%</td>
<td>19.4%</td>
<td>19.5%</td>
</tr>
<tr>
<td>181-200g</td>
<td>10.6%</td>
<td>10.7%</td>
<td>10.0%</td>
</tr>
<tr>
<td>201-250g</td>
<td>10.1%</td>
<td>9.9%</td>
<td>9.0%</td>
</tr>
<tr>
<td>251-300g</td>
<td>2.2%</td>
<td>1.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>301-350g</td>
<td>0.5%</td>
<td>0.6%</td>
<td>0.5%</td>
</tr>
<tr>
<td>351-450g</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>450g+</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Mass (kg)³³:

<table>
<thead>
<tr>
<th>Type</th>
<th>EU 2002</th>
<th>ACEA 2001</th>
<th>ACEA 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol + Diesel</td>
<td>/</td>
<td>1198</td>
<td>1214</td>
</tr>
<tr>
<td>Petrol</td>
<td>/</td>
<td>1118</td>
<td>1122</td>
</tr>
<tr>
<td>Diesel</td>
<td>/</td>
<td>1318</td>
<td>1328</td>
</tr>
</tbody>
</table>

³² It is not possible to adjust the official EU CO₂ category distribution data for the 0.7 % cycle change. If such an adjustment were feasible, the effect would be for volumes to move into lower categories (e.g. 140 g & less cars would increase in volume as a % of total).
<table>
<thead>
<tr>
<th></th>
<th>Petrol + Diesel</th>
<th>Petrol</th>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (kW):</td>
<td>-1.3%</td>
<td>75</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>74</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>-1,3%</td>
<td>80</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Capacity (cm³):</td>
<td>0.2%</td>
<td>1744</td>
<td>1735</td>
</tr>
<tr>
<td></td>
<td>0.3%</td>
<td>1585</td>
<td>1584</td>
</tr>
<tr>
<td></td>
<td>-0.1%</td>
<td>1947</td>
<td>1959</td>
</tr>
<tr>
<td></td>
<td>1748</td>
<td>1589</td>
<td>1945</td>
</tr>
</tbody>
</table>

33 EU data on mass is being re-checked by Commission and therefore not displayed in this report. ACEA data are based on the basis of curb weight; EU data are based on the definition given in Decision 1753/2000/EC. Therefore a comparison between data of ACEA and EU is not possible.
ANNEX 3: Monitoring Rules for Innovative Concepts

| BOUNDARY AGREEMENT ON THE GUIDELINES FOR THE ACCEPTANCE OF INNOVATIVE CONCEPTS WITHIN THE MONITORING OF THE COMMITMENTS OF ACEA, JAMA AND KAMA ON CO₂ REDUCTION FROM PASSENGER CARS |

A  GENERAL ASPECTS:

a) The basis of the assessment is the text of the Commitments and the Recommendations, and any decision must be closely linked to monitoring-related questions of the Commitment, and must be relevant for the quality of the monitoring.

b) Political aspects should also be taken into account, e.g., possible reactions of Council, EP, NGO and the general public, and all sides should avoid undermining the credibility of the Commitments.

c) Innovations in general should not be hampered, and technical passenger car innovations, e.g. lightweight vehicles, should be promoted. However, as a replacement it should be a “bona fide” and in principle a one-for-one replacement of a conventional vehicle.

d) Any definition or criteria of “innovative concept” set out in this document is exclusively for the purpose of the monitoring of the Commitment on CO₂ emission from passenger cars. They are not intended to be used in any other context or be seen by the auto industry as an indication by the Commission to establish any additional category of cars for the present or the future.

e) The “innovative concept” vehicles must meet a number of technical and environmental criteria.

B  SPECIFIC CRITERIA:

a) The “innovative concept” should meet at least the general criteria of M-class vehicles (Motor vehicles with at least four wheels used for the carriage of passengers).

b) The CO₂ emissions should be measurable in accordance with Directive 80/1268/EC and a CO₂ figure should be provided by the manufacturers (even if these vehicles are currently not covered by this Directive).

c) The “innovative concept” should meet at least the emissions limit values for regulated pollutants applicable to M1 vehicles.

d) The “innovative concept” vehicle should demonstrate passive and active safety appropriate to its intended use.

---

34 "The acceptance by the Commission of innovative concepts for vehicles replacing conventional cars in short-haul traffic as contributing factors to comply with the Commitment."

35 Innovative concepts for vehicles replacing conventional cars will be counted towards the achievement of this CO₂ emission target even if they are not included in the category M1 or are not currently covered by Directive 93/166/EC

36 In exceptional cases three wheel vehicles might be included, subject to a case-by-case decision
e) The “innovative concept” should have a minimum top speed that allows its usage on all types of public roads.\(^{37}\)

f) The “innovative concept” should comply with the ELV Directive.

C. Monitoring rule

(1) Vehicles – or natural developments of such vehicles - which were on the market before 1995 are not considered as “innovative concepts”.

(2) The associations shall show clear evidence that the innovative concept it proposes is marketed and promoted to end users as a replacement to a conventional car in short haul traffic.

(3) Innovative concepts have to replace conventional cars. The car industry has to provide evidence of replacement numbers. If such evidence cannot be provided on at least 50% of the registrations, a maximum of 100 000 units on the total EU market will be taken into account.

In the Monitoring Report “innovative concepts” will be treated in a separate chapter.

\(^{37}\) E.g., the usage of some roads require minima speeds
Monitoring of JAMA’s Commitment on CO₂ Emission Reductions from Passenger Cars (2002)

Final Report 5 September 2003

Joint Report
of the
Japan Automobile Manufacturers Association
and
the Commission Services
Monitoring of JAMA Commitment\textsuperscript{38} on CO\textsubscript{2} Emission Reductions from Passenger Cars

JOINT REPORT OF JAMA AND THE COMMISSION SERVICES\textsuperscript{39}: YEAR 2002 REPORT

ES SUMMARY OF PROGRESS IN DELIVERING THE COMMITMENT

<table>
<thead>
<tr>
<th>E1</th>
<th>Trends in specific emissions of CO\textsubscript{2} (g/km)</th>
</tr>
</thead>
</table>

In 2002 JAMA members decreased the averaged specific CO\textsubscript{2} emissions of passenger cars registered within the EU by about 4 g/km to 174 g/km\textsuperscript{40}. This is a 2.5 \%\textsuperscript{41} drop from 2001. Consequently JAMA accomplished the intermediate target set for the year 2003 in 2002.

For petrol-fuelled cars, specific emissions dropped to 172 g/km in 2002 – a 1.0 \% reduction compared to 2001. For diesel-fuelled cars, the value is 180 g/km – a 9.5 \% reduction compared to 2001.

Over the full reporting period 1995 to 2002, specific average emissions showed a consistent downward trend. On average specific CO\textsubscript{2} emission (g/km) levels of Japanese cars registered in the EU have decreased by an average of 1.5 \%\textsuperscript{42} a year and fell from 196 g/km in 1995 to 174 g/km in 2002, achieving an 11.4 \% reduction from 1995 (see Figure 1).

The average CO\textsubscript{2} emission levels of gasoline-fuelled cars recorded a decrease from 191 g/km in 1995 to 172 g/km in 2002 - a 10 \% reduction as compared with 1995. The average CO\textsubscript{2} emission levels of diesel cars recorded a decrease from 239 g/km in 1995 to 180 g/km - a 24.9 \% reduction as compared with 1995.

\textsuperscript{38} As recognized by the European Commission in the Recommendation of 13 April 2000 on the reduction of CO\textsubscript{2} emissions from passenger cars (2000/304/EC). Hereafter referred to as “The Commitment”

\textsuperscript{39} Hereafter often referred to as “The Commission”

\textsuperscript{40} For the first time, official EU data is used in this Joint Monitoring Report. According to the Joint Monitoring System the monitoring has to be based on the data delivered under Decision 1753/2000/EC. According to this scheme prior 1995-2001 monitoring was based on data provided by JAMA. The Annex contains comparisons of data from EU and JAMA sources, whenever appropriate. In the 2002 report JAMA data continues to be used in certain places, in particular where consistent longer-term trends contribute to a better understanding of CO\textsubscript{2} reduction developments (and EU data is not available to fulfil this role). Official EU data about CO\textsubscript{2} emissions include AFV. However, it should be noted that the number of AFV was so small in the past, and still is, that these vehicles are negligible for the calculated CO\textsubscript{2} average.

\textsuperscript{41} All percentage figures are based on unrounded numbers and include decimals.

\textsuperscript{42} This value is a simple arithmetic average, and throughout the text simple arithmetic averages are used.
Figure 1: EU Trends\(^{43}\) of JAMA members’ fleet in average specific emissions of CO\(_2\) (Based until 2001 on JAMA data; for 2002 the official EU data are used\(^{44}\). 2001 and 2002 data are corrected by 0.7 % for cycle adjustment.)

**E2 Trends in specific fuel consumption by fuel type (l/100 km)**

Fuel efficiency in 2002 improved on 2001 for both petrol and diesel cars. 2001 values were 7.3 l/100km for petrol, 7.5 l/100km for diesel and 7.3 l/100km for all JAMA members’ new registrations\(^{45}\). In 2002 comparable values were 7.3 l/100km, 6.8 l/100km and 7.1 l/100km. Gasoline passenger cars, which counted for the majority of JAMA member's passenger cars registered within the EU over the full 1995 to 2002 reporting period, consumed about 8.0 l/100 km in 1995. Their average fuel consumption decreased to 7.2 l/100 km in 2002. Diesel cars consumed an average of 8.9 l/100 km in 1995, and achieved an average fuel consumption of 6.8 l/100 km in 2002 (see Figure 2).

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\(^{43}\) Figure 1 shows in particular JAMA time-series data for 1995 to 2002. In the 2001 Joint Monitoring Report, JAMA’s 2001 CO\(_2\) figure was shown as 179 g/km. This figure did not include a cycle change correction factor (see Section 2.11); the Commission and JAMA have now agreed that the correction factor should be 0.7 %. This means that, using exact figures, JAMA's CO\(_2\) figure in 2001 was 178 g/km.

\(^{44}\) JAMA data and Commission data for the EU are nearly identical.

\(^{45}\) The following conversion factors were used for the calculation of specific fuel consumption (l/100km) from specific CO\(_2\) emissions (g/km): petrol 23.7, diesel 26.6.
E3 \textbf{Trends in physical fleet characteristics}

The average mass\textsuperscript{46} of new petrol cars increased slightly from 2001 to 2002 – from 1 136 kg to 1 146 kg; for diesel the values decreased from 1538 kg to 1468 kg. When all new registrations are combined the average mass was 1 207 kg in 2001 and 1 220 kg in 2002. Average engine power of new registrations increased slightly, from 76 kW in 2001 to 77 kW in 2002. Average engine capacity decreased slightly, from 1 668 cm\textsuperscript{3} in 2001 to 1 666 cm\textsuperscript{3} in 2002.

The general trends in physical characteristics over the whole reporting period 1995 to 2002 show an increase, notably in mass (+ 12 \%). This is mainly due to increasing gasoline car weight (+ 11 \%) and increased diesel passenger car registrations (+ 209 \%) over the reporting period. Average engine capacity increased by 2.7 \% over the period from 1995 to 2002. The engine power increased by 10.5 \% over the same period.

E4 \textbf{Technical developments introduced to reduce CO}_2 \textbf{ emissions}

The main new technologies introduced since 1995 include the gasoline and diesel direct injection engines. The Continuous Variable Transmission Technology (CVT) has already been introduced and continues to be used on cars sold on the market. JAMA members have also introduced hybrid cars and idle stop mechanism in 2000.

\textsuperscript{46} JAMA’s data are based on the kerb weight of the vehicle.
E5 Brief overall assessment on progress in relation to the target

In 2002 JAMA Members decreased the averaged specific CO₂ emissions of passenger cars registered within the EU by about 4 g/km to 174 g/km\textsuperscript{47}. This is a 2.5 % drop compared to 2001. JAMA already accomplished already in 2002 the 2003 intermediate target (165 to 175 g/km).

Over the whole reporting period, 1995 to 2002, JAMA members fleet's average specific CO₂ emissions fell from 196 g/km in 1995 to 174 g/km in 2002. Japanese automobile manufacturers have produced passenger cars achieving lower specific CO₂ emission levels since 1995, achieving in that period a 11.4 % decrease in average CO₂ specific emissions.

The share of diesel cars in JAMA members' fleets has increased over the reporting period. While in 1995 gasoline cars accounted for 89.6 % of the fleet and diesel cars for 10.4 % in 1995, in 2002 the shares were 76.8 % and 23.2 % respectively.

An important achievement before the 2003 review is the launch on the EU market of gasoline cars emitting 120 g/km or less. Although sales remain small (43 743 vehicles in 2002), this shows a positive effort made by JAMA.

JAMA accomplished already in 2002 the 2003 intermediate target. Further CO₂ emissions reductions are required to meet the final target (140 g/km in 2009). Emissions reductions will have to fall faster (around 2.8 %) for the 2009 target (140 g/km) to be met, see Figure 3. It should be mentioned that JAMA expected from the beginning that the reduction profile would be relatively slow initially and gather pace later.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{Figure 3 – The current and required annual rates of CO₂ reduction}
\end{figure}

To achieve the CO₂ emission targets agreed upon in the commitment by 2009, Japan automobile manufacturers will further explore various technologies namely Direct Injection (DI), hybrid vehicles and Continuous Variable Transmission Technology (CVT) etc. JAMA emphasizes the difficulty of planning and managing of CO₂ reduction due to unknown factors such as changes of consumer demands.

\textsuperscript{47} For the first time, official EU data is used in this joint monitoring report. In the 2002 report JAMA data continues to be used in certain places, in particular where longer-term trends contribute to a better understanding of CO₂ reduction developments (and EU data is not available to fulfil this role)
In summary, the Commission and JAMA currently have no reason to believe that JAMA would not live up to its Commitment.

1. MONITORING OF TECHNOLOGICAL DEVELOPMENTS AFFECTING THE COMMITMENT

1.1 Commitment initiatives

| Brief description of current R&D programs |

Sections 1.2 and 2.5 cover JAMA technological developments and research activities.

1.2 Technological developments

| 1.2.1 Description of fuel efficiency characteristics of new technologies, alternative concepts |
| 1.2.2 Availability of new technologies in the EU and Member States |
| 1.2.3 Availability of alternative concepts passenger cars in the EU |
| 1.2.4 Availability of low emission passenger cars (e.g. emitting 120g/km or less) in the EU |

JAMA has committed itself to achieving a 140 g/km emission target by 2009 and JAMA's members are continuing CO₂ emission reduction R&D toward this goal. Ongoing efforts are made to make technological improvements successively available to the market. Technological developments achieved by JAMA's members within the reporting period include Direct Gasoline and Diesel Injection engines and Continuous Variable Transmission Technology (CVT). JAMA has also launched hybrid cars and the Idle Stop Mechanism on the EU market during 2000.

The CO₂ emission reduction technologies made available by JAMA to the market are shown in Figure 6 in Section 2.5. A direct injection gasoline model has been on the market since 1997. A direct injection diesel car debuted on the market in 1998 and has seen a very quick uptake by the markets in 2002 (approximately 19 % of JAMA member's first registrations in 2002). Efforts are also made to diffuse the Continuous Variable Transmission Technology (CVT) available on the market prior to 1995.

Several low-emission passenger cars have been put on the EU market in recent years, achieving 120 g/km or less. In 2000, JAMA member companies have put a 80 g/km gasoline-hybrid car and another 119 g/km car with Idle stop mechanism on the market. A new 120 g/km gasoline-hybrid model was launched in the autumn of 2000.

1.3 Description of market trends in physical fleet characteristics

For Japanese cars as a whole, based on JAMA’s figures, the average mass of vehicles increased by around 12 % in 2002 as compared with 1995. The main factor is the increase in the weight of gasoline-fuelled cars (mass increased by around 11 %). Engine capacity of Japanese cars showed a shift towards an increase by approximately 2.8 % and their engine power presented an increase by approximately 10.0 % in 2002 as compared with 1995. CO₂ emission levels, however, showed a decrease of approximately 11.4 % for Japanese cars as a whole in 2002 as compared with 1995, a sign that the cars available on the market have benefited from CO₂ reduction technologies (see Section 2.4 for further details and linkage to CO₂). Data from Member States are presented in Annex 1 and 2.

2.1 Trends in specific emissions of CO₂ (g/km)

From 2001 to 2002 the average specific emissions from JAMA new car registration in the EU dropped by 2.5% to 174 g/km. For gasoline-fuelled cars the corresponding reduction was 1.0%, and for diesel fuelled cars average specific emissions were 9.5% lower in 2002 than in 2001.

The average specific CO₂ emission levels of Japanese cars over the entire reporting period showed a downward trend (see Figure 4). Their average specific CO₂ emission levels decreased by an average of roughly 1.5% each year and fell from 196 g/km in 1995 to 174 g/km in 2002 (marking an 11.4% reduction as compared with 1995).

The averaged specific CO₂ emission levels of gasoline-fuelled cars recorded a decrease from 191 g/km in 1995 to 172 g/km in 2002 -a 10.0% reduction as compared with 1995. This gives an average annual reduction of around 1.4%.

The averaged specific CO₂ emission levels of diesel cars recorded a decrease from 239 g/km in 1995 to 180 g/km in 2002 - a 24.9% reduction. This amounts to a 3.6% average reduction over the period.

Total average fuel consumption decreased within the reporting period 1995 to 2002: the diesel fuel consumption decreased from about 9.0 l/100 km to 6.8 l/100km, and the gasoline fuel consumption from 8.0 l/100 km to 7.3 l/100km. For all vehicles, the average fuel consumption was 7.1 l/100km.

Figure 4: JAMA members’ CO₂ reduction index (1995=100) (Based on JAMA data until 2001; for 2002 official EU data is used. 2001 and 2002 data are corrected by 0.7% for cycle adjustment)

2.2 Number of newly registered passenger cars

The number of registered gasoline passenger cars increased from 1,013,138 vehicles in 1995 to 1,202,578 vehicles in 2002 (+18.7%). Petrol cars represent about 76.8% of total first registrations of petrol and diesel cars produced by JAMA members.
The number of registered diesel passenger cars increased from 117,577 in 1995 to 362,891 in 2002 (+208.6%), showing the much bigger increment than gasoline cars (see Figure 5). Corresponding values for 2001 were: 1,203,433 petrol cars, 265,328 diesel cars, and 1,520,643 for all car registrations in 2001\textsuperscript{49}.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure5.png}
\caption{Number of newly registered passenger cars by JAMA members (unit registrations) (Based on JAMA data)}
\end{figure}

\textsuperscript{48} For 2001, petrol and diesel cars together amount to 1,468,761 cars. “Unknown vehicles” make up the difference with the total vehicles (1,520,643). For 2002, petrol and diesel cars together amount to 1,565,469 cars; total vehicles were 1,621,469.

\textsuperscript{49} First registration numbers are taken from JAMA
2.3 Fleet composition

The share of cars emitting categories 160 g/km and less has increased from 16.2 % in 1995 to 41.0 % in 2002, while the share of the car emitting more than 161 g/km decreased from 83.8 % to 59.0 %.

Figure 6: JAMA's fleet composition per CO2 category in shares of total (petrol + diesel) in 1995 and 2002

Furthermore, as Figure 6 shows, a significant increase in registrations can be seen in the category “121 to 140 g/km”; there were 203,012 new registrations for this category in 2002, up from 22,055 in 1995. Figure 6b shows the rapid growth in the 140 g/km or less and 141 g/km to 160 g/km ranges over the reporting period. Over the same period, there was a significant drop in the registration of vehicles in the 181 g/km to 200 g/km range, as well as reduction in shares in all higher emissions ranges.

Figure 6b: Change in JAMA's fleet composition between 1995, 2001 and 2002 by “aggregated CO2 categories” (Based on JAMA data)

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50 JAMA data
2.4 EU trends in physical fleet characteristics

Changes in physical characteristics\(^{51}\) - engine power and cylinder capacity - showed an upward trend from 2001 to 2002, continuing the overall trend present from 1995 (see Figures 7a and 7b). The average mass of new car registrations rose slightly from 1207 kg in 2001 to 1220 kg in 2002; engine capacity decreased from 1668 cm\(^3\) to 1666 cm\(^3\); and power rose from 76 kW to 77 kW in 2002. Average diesel-fuelled car mass was over a third higher than that for petrol, and the capacity was 37 % higher for diesel-fuelled cars than for petrol cars.

Average total automobile mass was 1095 kg in 1995 and increased by 11.4 % over the reporting period (1220 kg in 2002). Gasoline automobiles' average mass has increased by 8.5 % within the reporting period, from 1056 kg in 1995 to 1146 kg in 2002. Diesel automobiles' average mass reached the minimum of 1447 kg in 1997 (against 1461 kg in 1995) but increased up to 1557 kg in 2001, then decreased again to 1468 kg in 2002; i.e. a 0.5 % increase over the reporting period 1995 to 2002.

Total engine capacity has increased by 2.8 % within the reporting period, from 1621 cm\(^3\) in 1995 to 1666 cm\(^3\) in 2002. Gasoline engine capacity reached a peak of 1558 cm\(^3\) capacity in 1998 (against 1543 cm\(^3\) in 1995) and decreased to 1533 cm\(^3\) in 2002 (-0.6 % as compared with 1995). Diesel engine capacity reached its minimum 2104 cm\(^3\) capacity in 2002 (against 2298 cm\(^3\) in 1995). The overall trend shows only a marginal growth in average engine capacity over the reporting period.

While total engine power was 70 kW in 1995, and rose to 77 kW by 2002, a 10.0 % increase in EU average over this five years period. Gasoline engine power has increased from 70 kW in 1995 to 76 kW in 2002. Diesel engine power has steadily increased by 24.2 % within the reporting period, i.e. from 66 kW in 1995 to 82 kW in 2002.

The physical characteristics increased over the period, however, average specific CO\(_2\) emissions dropped by 11.4 % in the same time (see Figure 7b).

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\(^{51}\) Trend analysis based on JAMA data
2.5 Trends in new technologies in the EU

JAMA's members have introduced several new technologies on the EU market over the monitoring period (see description in 1.2). Trends in sales vary across technologies, but overall, with the exception of direct injection diesel engines the shares of these technologies remain small. The shares of cars equipped with direct injection diesel engines have increased from 0% to 19.2% since their respective launch in 1998. Sales of cars equipped with Continuous Variable Transmission Technology (CVT) have shown some upward trends. It’s also included the hybrid cars and Idle Stop Mechanism since 2000.

The trends for each technology, as well as the share of new passenger cars equipped with these technologies in total new passenger car sales by JAMA members, are shown in Figure 8.

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</tr>
<tr>
<td>Direct Injection for diesel engines was introduced to the market in 1998 and shows rapid growth from 1999 to 2002.</td>
<td><img src="image.png" alt="Graph" /></td>
</tr>
<tr>
<td>CVT was first marketed in 1988. No significant trend can be stated.</td>
<td><img src="image.png" alt="Graph" /></td>
</tr>
<tr>
<td>Alternative Concepts are studied by the manufacturers but they were not introduced in the market yet.</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 8: Trends in new technologies launched by JAMA members on the EU market**

2.6 Trends in low emission passenger cars in the EU

JAMA released its first “120 g/km or less” car on the EU market in 1999. In 2000, JAMA has launched a 119 g/km car and an 80 g/km gasoline-hybrid car. Furthermore, JAMA released a 120 g/km gasoline-hybrid model in the autumn of 2000 (see Section 1.2.4).
In 2002, 43,804 JAMA cars with emissions of 120 g/km or less were registered in the EU, up from 5,544 cars in 1999. Previously there had been no registrations of vehicles in this emissions category.

![Figure 9: JAMA members’ new registrations of vehicle with specific emission of 120 g/km or less](image)

### 2.7 Trends in alternative concepts passenger cars in the EU

Nothing to report.

### 2.8 Trends in innovative concepts passenger cars in the EU

In 2002 the car manufacturers’ associations and the Commission agreed guidelines for the acceptance of innovative concepts within the monitoring of the commitments (see Annex 3).

### 2.9 Brief description of the degree of occurrence of grey areas between M1 and N1 vehicles

Based on own data JAMA estimates the number of M1 vehicles with a type approval for M1 and N1 which are potentially registered as N1 in the EU is equal to a total of 6,731 vehicles or 4.2% of total registrations in 2002.

### 2.10 Data methods, data sources and data confidence levels

For the first time since the inception of the Joint CO₂ Monitoring Reports, this 2002 report uses data from the official EU scheme (1753/2000/EC), that is based on Member State submissions (see Annex). Until now, JAMA purchased data from Marketing Systems Corporation, so as to enable the annual monitoring exercises to be undertaken. The data submitted by Member States are the official figures for the monitoring process.

However, with official EU data becoming available, a discontinuity from the past data series might exist; because of some differences in data treatment and data collection it is not appropriate to simply adjoin official data for most recent years, onto JAMA's historical data.
The main dimensions of this discontinuity are:

**Methodology Differences**: JAMA data links registrations to Marketing Systems vehicle specification information, which is used for all Member State registrations. For EU data, each Member State has its own vehicle specification set, to which it links its national registrations; national variations in these vehicle specifications exist. JAMA's data provider tries to improve incomplete data sets with the help of their databanks while Member States count only cars with complete data sets. The methodologies used by the data provider for closing gaps in the data sets are not known.

**Registration Data Differences**: The official EU data misses a sizeable percentage of new car registrations (7.5% compared to JAMA data about total number of new registrations)\(^{52}\). In 2002, the largest difference was in Spain. Official EU data do not include cars for which no CO\(_2\) data are available for the Member States. Whereas, in the case of JAMA data, if no CO\(_2\) information was available or could be provided by the vehicle specification database, any such vehicles would be included under an "unknown" category.

**Grey Area Problem**: According to JAMA this is a likely source of difference, which needs more thorough investigation -- particularly the number of M1 vehicles potentially registered as N1. For JAMA data, the grey area issue is small; for EU data it is an unknown volume.

**Data Scope**: The official EU data covers the CO\(_2\) emissions of cars using all fuels, including AFVs whereas JAMA's CO\(_2\) data has consistently been on the basis of petrol + diesel cars\(^{53}\).

However, currently the variance between EU & JAMA data in terms of the overall average CO\(_2\) figure is very small. In fact all rounded numbers are identical.

Nevertheless, actual and underlying methodological differences exist between the EU data and JAMA's data so that the EU data cannot be simply adjoined onto JAMA's historical CO\(_2\) time-series built-up from 1995. As a result, the EU data does currently not provide a means to undertake longer-term "trend" evaluations of some key CO\(_2\) developments (e.g. developments in some Member States, trends in vehicle mass\(^{54}\)) that can contribute to a better understanding of CO\(_2\) reduction developments. For this reason this Joint Report uses JAMA's consistent historical data through to 2002 for such trend evaluations.

### 2.11 Description of measurement issues for CO\(_2\) emission factors

The JAMA Commitment specified that new car CO\(_2\) emissions will be measured according to Directive 93/116/EC. Since the establishment of the JAMA Commitment, the mandatory type approval method of measuring CO\(_2\) emissions has been revised by Directive 99/100/EC. One of the principle changes (introduced over the period 2000 to 2002 for M1 vehicles) relates to the drive

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\(^{52}\) In the JAMA database 55 996 vehicles did not have specific CO\(_2\) emissions values, and are hence excluded from the calculation of average specific CO\(_2\) emissions. This represents 3.5% of total new registrations. However, it should be noted that the difference between total registrations and identified versions does not automatically lead to differences in the calculated CO\(_2\) averages. This would be only the case if the characteristics of the missing data deviate systematically from the characteristics of the total fleet.

\(^{53}\) It should be noted that the number of AFV was so small in the past, and still is, that these vehicles are negligible for the calculated CO\(_2\) average. Since all AFV vehicles are not originally produced by JAMA members but retrofitted, JAMA wanted them not to be shown in the annexed tables.

\(^{54}\) JAMA provides data of the empty vehicles while the data requested by decision 1753 are those of the empty vehicles plus all liquids and 75 kg for the driver.
cycle - the deletion of the initial 40 seconds of unmeasured engine idling prior to the commencement of the test. As a rule, such a change of test procedure increases the measured value of CO₂ emissions.

Since January 2001 almost all new M1 vehicles have had their CO₂ emissions measured according to the "new" directive/cycle (99/100/EC). A correction factor needs to be applied to the measured CO₂ emissions of such vehicles to broadly bring them in line with the 93/116/EC procedure, which is the basis on which JAMA's future targets were established and the basis of historical monitoring data in this report. In 2002 JAMA and the Commission reached a consensus on this correction factor adjustment; it was agreed that a 0.7 % reduction should be applied to "measured" emissions to align them with the Commitment's basis. In this report, this adjustment has been applied to 2001 and 2002 data. For future years it was also agreed that this 0.7 % adjustment should be maintained unless new data is provided by the associations, that proves its inappropriateness.

2.12 Other issues

Nothing to report.

3. KEY ASSUMPTIONS TO THE COMMITMENT

3.1 Availability of enabling fuels

| Statement on implication for the Commitment and justification |

Nothing to report

3.2 Distortion of competition

| Statement on implication for the Commitment and justification |

Nothing to report.

3.3 Promotion of CO₂ efficient technologies

| Statement on implication for the Commitment and justification |

Nothing to report.

3.4 Acceptance of innovation

| Statement on implication for the Commitment and justification |

Nothing to report.

4. OTHER ISSUES

4.1 New measures affecting CO₂

| Comment on impact of the issue and on implication for the Commitment |

Nothing to report.

4.2 New regulatory measures

| Comment on impact of the issue and on implication for the Commitment |

JAMA anticipates that the End of Life Vehicle (ELV) Directives will have adverse implications for the fuel efficiency of cars, as it may limit in its opinion the use of certain light materials and
technologies, while burdening significantly the companies. The Commission does not expect negative repercussions of the ELV Directive on the commitment.

4.3 Fiscal measures
Comment on impact of the issue and on implication for the Commitment

Nothing to report.

4.4 Breakthrough technologies
Comment on impact of the issue and on implication for the Commitment

Nothing to report.

4.5 Research programmes: Description and future potential
Comment on impact of the issue and on implication for the Commitment

Nothing to report.

4.6 Other measures - telematics, infrastructure, education
Comment on impact of the issue and on implication for the Commitment

JAMA believes that measures such as the promotion of trade in purchase of new cars, presentations of correct and proper car maintenance methods, driver training, optimization of infrastructure, effective and efficient land use, and efforts to achieve a smoother traffic road will have a beneficial effect on CO₂ reduction. JAMA thinks that such measures should therefore be embraced in a positive manner under government lead and with the co-operation of the industrial sectors involved.

4.7 Economic situation of the car industry
Comment on impact of the issue and on implication for the Commitment

Nothing to report.

5. CONCLUSIONS

5.1 Progress statement on delivering the Commitment

Since 1995 JAMA maintains a consistent trend of CO₂ emission reduction. In 2002 the average specific emissions of JAMA's new car fleet registered in the EU was 174 g/km. JAMA's performance is hereby ahead of the estimated intermediate target of 165 - 175 g/km, considered in JAMA’s commitment for 2003. It is to note that JAMA also met in time its first commitment to introduce not later than 2000, models emitting 120 g/km CO₂ or less. In 2002 the number of new registered cars emitting 120 g/km CO₂ rose considerably. Also the share of cars emitting 140 g/km CO₂ or less continued to rise consistently in 2002. This is further evidencing of JAMA's determination to meet its Commitment.

5.2 Statement on expected future progress of the Commitment

JAMA achieved the intermediate target range of 165 - 175 g/km in 2002, one year earlier than estimated. The final target value of 140 g/km in 2009 requires further serious effort by the Japanese automobile manufacturers. Emissions reductions will have to fall faster for the 2009 target (140
g/km) to be met. For the 2009 target, annual emissions reductions will have to increase to an average of 2.8 % per year over the period until 2009.

Importantly, and as agreed upon, this target will mainly be achieved by technological developments affecting different car characteristics and market changes linked to these developments. Regarding technological developments, JAMA reiterated that its members would aim at a high share of new cars equipped with CO₂ efficient technologies. Japanese automobile manufacturers have agreed to make every endeavor to contribute to the achievement of JAMA’s goals.

In order to achieve the targets JAMA believes that the following would be desirable:

1. The full market availability of fuels with lower sulfur to enable the application of technologies needed for the industry to achieve its CO₂ commitment.
2. Sound development of automobile industry and manufacturers' stable profitability.
3. Adopting measures to diffuse CO₂ emission reduction technologies in consideration of a balanced approach with regard to other regulatory requirements.

The Commission Services and JAMA have presently no reason to believe that the target will not be reached.
DATA ANNEXES (2002)

ANNEX 1

A1: SPECIFIC FUEL EFFICIENCY (l/100km) AND EMISSIONS OF CO₂ (g/km) AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE FOR THE EU AND EACH MEMBER STATE

A2: THE DISTRIBUTION OF CO₂ EMISSIONS (g/km) IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

A3: THE DISTRIBUTION OF AVERAGED POWER AND ENGINE CAPACITY OF NEW PASSENGER CARS FOR EACH FUEL TYPE FOR THE EU-15 AND EACH MEMBER STATE

ANNEX 2: KEY DATA COMPARISON

ANNEX 3: MONITORING RULES FOR INNOVATIVE CONCEPTS
### A1: SPECIFIC FUEL EFFICIENCY (l/100km) AND EMISSIONS OF CO₂ (g/km)\(^{55}\) AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE FOR THE EU AND EACH MEMBER STATE\(^{56}\)

**JAMA MEMBERS - 2002**

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\(^{55}\) The emission-values of CO₂ are corrected by 0.7 \% for test cycle adjustment.

\(^{56}\) On request of JAMA AFV are excluded.
A2: THE DISTRIBUTION OF CO₂ EMISSIONS (g/km) \(^{57}\) IN THE NEW PASSENGER CAR FLEET\(^{58}\) FOR EACH DIFFERENT FUEL TYPE\(^{59,60}\)

JAMA MEMBERS - 2002

<table>
<thead>
<tr>
<th>CO₂-Category</th>
<th>Petrol</th>
<th></th>
<th></th>
<th>Diesel</th>
<th></th>
<th></th>
<th>Petrol + Diesel</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Average CO₂</td>
<td></td>
<td>Number</td>
<td>Average CO₂</td>
<td></td>
<td>Number</td>
<td>Average CO₂</td>
<td></td>
</tr>
<tr>
<td>&lt;60</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>60-80</td>
<td>45</td>
<td>80</td>
<td>0</td>
<td>0</td>
<td>45</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81-100</td>
<td>89</td>
<td>98</td>
<td>1</td>
<td>98</td>
<td>90</td>
<td>98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101-120</td>
<td>16 662</td>
<td>119</td>
<td>26 946</td>
<td>116</td>
<td>43 608</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>121-140</td>
<td>197 933</td>
<td>136</td>
<td>14 285</td>
<td>134</td>
<td>212 218</td>
<td>135</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>141-160</td>
<td>306 512</td>
<td>153</td>
<td>72 813</td>
<td>154</td>
<td>379 325</td>
<td>153</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>161-180</td>
<td>236 289</td>
<td>172</td>
<td>89 401</td>
<td>168</td>
<td>325 690</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>181-200</td>
<td>164 134</td>
<td>188</td>
<td>72 257</td>
<td>190</td>
<td>236 391</td>
<td>189</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>201-250</td>
<td>214 261</td>
<td>217</td>
<td>10 606</td>
<td>230</td>
<td>224 867</td>
<td>218</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>251-300</td>
<td>16 787</td>
<td>273</td>
<td>49 304</td>
<td>269</td>
<td>66 091</td>
<td>270</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>301-350</td>
<td>7 673</td>
<td>314</td>
<td>2 424</td>
<td>339</td>
<td>10 097</td>
<td>320</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>351-450</td>
<td>289</td>
<td>387</td>
<td>9</td>
<td>369</td>
<td>298</td>
<td>387</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;450</td>
<td>1</td>
<td>499</td>
<td>1</td>
<td>499</td>
<td>2</td>
<td>499</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{57}\) It is not possible to adjust the official EU CO₂ category distribution data for the 0.7 % cycle adjustment. If such an adjustment were feasible, the effect would be for volumes to move into lower categories (e.g. 140 g & less cars would increase in volume as a % of total).

\(^{58}\) The following vehicles were suppressed due to possible data implausibility: 4 petrol cars with 79 gCO₂/km as an average from the category 60-80 gCO₂/km, 12 diesel cars with 60 gCO₂/km as an average from the category 60-80 gCO₂/km, 1 petrol cars with 942 gCO₂/km as an average from the category >450 gCO₂/km.

\(^{59}\) The total number of vehicles based on the data from Member States is smaller than the total number of vehicles according to the data of the car manufacturers association because the Member States submit exclusively data about those vehicles for which corresponding CO₂ data are available in their data base.

\(^{60}\) On request of JAMA AFV are excluded.
A3 : THE DISTRIBUTION OF AVERAGED\(^{61}\) POWER AND ENGINE CAPACITY OF NEW PASSENGER CARS FOR EACH FUEL TYPE FOR THE EU-15 AND EACH MEMBER STATE\(^{62}\)

JAMA MEMBERS - 2002

<table>
<thead>
<tr>
<th>Member State</th>
<th>Power [kW]</th>
<th>Capacity [cm³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Petrol</td>
<td>Diesel</td>
</tr>
<tr>
<td>EU-15</td>
<td>Petrol</td>
<td>Diesel</td>
</tr>
<tr>
<td>A</td>
<td>74</td>
<td>83</td>
</tr>
<tr>
<td>B</td>
<td>73</td>
<td>77</td>
</tr>
<tr>
<td>DK</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>F</td>
<td>74</td>
<td>84</td>
</tr>
<tr>
<td>FIN</td>
<td>80</td>
<td>73</td>
</tr>
<tr>
<td>GER</td>
<td>78</td>
<td>84</td>
</tr>
<tr>
<td>GRE</td>
<td>71</td>
<td>81</td>
</tr>
<tr>
<td>IRE</td>
<td>71</td>
<td>83</td>
</tr>
<tr>
<td>IT</td>
<td>65</td>
<td>79</td>
</tr>
<tr>
<td>LUX</td>
<td>92</td>
<td>84</td>
</tr>
<tr>
<td>NL</td>
<td>71</td>
<td>81</td>
</tr>
<tr>
<td>POR</td>
<td>66</td>
<td>77</td>
</tr>
<tr>
<td>SP</td>
<td>79</td>
<td>88</td>
</tr>
<tr>
<td>SW</td>
<td>92</td>
<td>94</td>
</tr>
<tr>
<td>UK</td>
<td>73</td>
<td>88</td>
</tr>
</tbody>
</table>

\(^{61}\) EU data on mass is being re-checked by Commission and therefore not displayed in this report. A comparison between JAMA and official EU data is not possible.

\(^{62}\) On request of JAMA AFV are excluded.
ANNEX 2: Key Data Comparison

EU 2002 & JAMA 2001 and 2002 key data

<table>
<thead>
<tr>
<th></th>
<th>Differences JAMA 2002 and EU data</th>
<th>EU data: 2002</th>
<th>JAMA data: 2001</th>
<th>JAMA data: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ emissions (CO₂/g/km) 63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrol + Diesel</td>
<td>0.1 %</td>
<td>173.7</td>
<td>178.0</td>
<td>173.6</td>
</tr>
<tr>
<td>Petrol</td>
<td>0 %</td>
<td>171.7</td>
<td>173.5</td>
<td>171.7</td>
</tr>
<tr>
<td>Diesel</td>
<td>0.4 %</td>
<td>180.4</td>
<td>198.4</td>
<td>179.6</td>
</tr>
<tr>
<td>Total Car Registrations (million units)</td>
<td>7.0 %</td>
<td>1.46</td>
<td>1.47</td>
<td>1.57</td>
</tr>
</tbody>
</table>

Distribution of CO₂ emissions by CO₂ category (% share of petrol + diesel registrations) 64:

<table>
<thead>
<tr>
<th></th>
<th>EU data: 2002</th>
<th>JAMA data: 2001</th>
<th>JAMA data: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>120g &amp; less</td>
<td>2.9</td>
<td>0.4</td>
<td>2.8</td>
</tr>
<tr>
<td>121-140g</td>
<td>14.2</td>
<td>10.1</td>
<td>13.0</td>
</tr>
<tr>
<td>141-160g</td>
<td>25.3</td>
<td>28.4</td>
<td>26.4</td>
</tr>
<tr>
<td>161-180g</td>
<td>21.7</td>
<td>23.0</td>
<td>22.0</td>
</tr>
<tr>
<td>181-200g</td>
<td>15.8</td>
<td>15.6</td>
<td>16.5</td>
</tr>
<tr>
<td>201-250g</td>
<td>15.0</td>
<td>16.2</td>
<td>14.7</td>
</tr>
<tr>
<td>251-300g</td>
<td>4.4</td>
<td>5.1</td>
<td>3.9</td>
</tr>
<tr>
<td>301-350g</td>
<td>0.7</td>
<td>1.2</td>
<td>0.7</td>
</tr>
<tr>
<td>351-450g</td>
<td>0 (0.04)</td>
<td>0 (0.02)</td>
<td></td>
</tr>
</tbody>
</table>

Mass (kg) 65: Petrol + Diesel

<table>
<thead>
<tr>
<th></th>
<th>EU data: 2002</th>
<th>JAMA data: 2001</th>
<th>JAMA data: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol</td>
<td>/</td>
<td>1 207</td>
<td>1 220</td>
</tr>
<tr>
<td>Diesel</td>
<td>/</td>
<td>1 136</td>
<td>1 146</td>
</tr>
</tbody>
</table>

Power (kW): Petrol + Diesel

<table>
<thead>
<tr>
<th></th>
<th>EU data: 2002</th>
<th>JAMA data: 2001</th>
<th>JAMA data: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol</td>
<td>1.3%</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>Diesel</td>
<td>2.6%</td>
<td>74</td>
<td>74</td>
</tr>
</tbody>
</table>

Capacity (cm³): Petrol + Diesel

<table>
<thead>
<tr>
<th></th>
<th>EU data: 2002</th>
<th>JAMA data: 2001</th>
<th>JAMA data: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol</td>
<td>0.1%</td>
<td>1 664</td>
<td>1 668</td>
</tr>
<tr>
<td>Diesel</td>
<td>0.4%</td>
<td>1 527</td>
<td>1 530</td>
</tr>
<tr>
<td>Petrol</td>
<td>0.8%</td>
<td>2 121</td>
<td>2 296</td>
</tr>
</tbody>
</table>

63 Data corrected by 0.7% for cycle adjustment.
64 It is not possible to adjust the official EU CO₂ category distribution data for the 0.7 % cycle adjustment. If such an adjustment were feasible, the effect would be for volumes to move into lower categories (e.g. 140 g & less cars would increase in volume as a % of total).
65 Comparison between data of JAMA and EU is not possible. Decision 1753/2000/EC defines the data to be delivered. EU data on mass is being re-checked by Commission. There is concern that in some Member States reporting of mass is not in compliance with Decision 1753/2000/EC. JAMA data are based on the basis of curb weight, and is not in accordance with the definition given in Decision 1753/2000/EC anyway.
Figure 10: Distribution of CO₂ emissions by CO₂ categories – official EU data and JAMA data
ANNEX 3: Monitoring Rules for Innovative Concepts

JOINT AGREEMENT ON THE GUIDELINES FOR THE ACCEPTANCE OF INNOVATIVE CONCEPTS WITHIN THE MONITORING OF THE COMMITMENTS OF ACEA, JAMA AND KAMA ON CO₂ REDUCTION FROM PASSENGER CARS

A. General aspects:

a) The basis of the assessment is the text of the Commitments and the Recommendations, and any decision must be closely linked to monitoring-related questions of the Commitment, and must be relevant for the quality of the monitoring.

b) Political aspects should also be taken into account, e.g., possible reactions of Council, EP, NGO and the general public, and all sides should avoid undermining the credibility of the Commitments.

c) Innovations in general should not be hampered, and technical passenger car innovations, e.g. lightweight vehicles, should be promoted. However, as a replacement it should be a “bona fide” and in principle a one-for-one replacement of a conventional vehicle.

d) Any definition or criteria of “innovative concept” set out in this document is exclusively for the purpose of the monitoring of the Commitment on CO₂ emission from passenger cars. They are not intended to be used in any other context or be seen by the auto industry as an indication by the Commission to establish any additional category of cars for the present or the future.

e) The “innovative concept” vehicles must meet a number of technical and environmental criteria.

B. Specific criteria:

a) The “innovative concept” should meet at least the general criteria of M-class vehicles (Motor vehicles with at least four wheels used for the carriage of passengers)

b) The CO₂ emissions should be measurable in accordance with Directive 80/1268/EC and a CO₂ figure should be provided by the manufacturers (even if these vehicles are currently not covered by this Directive)

c) The “innovative concept” should meet at least the emissions limit values for regulated pollutants applicable to M1 vehicles

66 "The acceptance by the Commission of innovative concepts for vehicles replacing conventional cars in short-haul traffic as contributing factors to comply with the Commitment."

67 Innovative concepts for vehicles replacing conventional cars will be counted towards the achievement of this CO₂ emission target even if they are not included in the category M1 or are not currently covered by Directive 93/166/EC"

68 In exceptional cases three wheel vehicles might be included, subject to a case-by-case decision
d) The “innovative concept” vehicle should demonstrate passive and active safety appropriate to its intended use.

e) The “innovative concept” should have a minimum top speed that allows its usage on all types of public roads\(^{69}\).

f) The “innovative concept” should comply with the ELV Directive.

C. Monitoring rule

1. Vehicles – or natural developments of such vehicles - which were on the market before 1995 are not considered as “innovative concepts”.  

2. The associations shall show clear evidence that the innovative concept it proposes is marketed and promoted to end users as a replacement to a conventional car in short haul traffic.

3. Innovative concepts have to replace conventional cars. The car industry has to provide evidence of replacement numbers. If such evidence cannot be provided on at least 50% of the registrations, a maximum of 100 000 units on the total EU market will be taken into account.

4. In the monitoring report “innovative concepts” will be treated in a separate chapter.

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\(^{69}\) E.g., the usage of some roads require minima speeds
Monitoring of KAMA’s Commitment on CO₂ Emission
Reductions from Passenger Cars (2002)

Final Report 5 September 2003

Joint Report
of the
Korea Automobile Manufacturers Association
and
the Commission Services
Monitoring of KAMA’s Commitment on CO₂ Emission Reductions from Passenger Cars

JOINT REPORT OF KAMA AND THE COMMISSION SERVICES: YEAR 2002

SUMMARY OF PROGRESS IN DELIVERING THE COMMITMENT

E1 Trends in specific emissions of CO₂ (g/km)

KAMA reduced the average CO₂ emission of its new passengers car fleet registered (petrol and diesel) in the EU market to 183 g/km in 2002, from 197 g/km in 1995 and 187 g/km in 2001. This represents a reduction of 6.9 % over the whole monitoring period of 1995 to 2002 and 1.8 % over the period 2001 to 2002.

Average specific CO₂ emission from petrol-fuelled cars fell from 195 g/km in 1995 and 179 g/km in 2001 to 178 g/km in 2002 (an 8.0 % and a 0.8 % drop). Even though average specific CO₂ emissions from diesel-fuelled cars fell from 309 g/km in 1995 and 234 g/km in 2001 to 203 g/km in 2002 (a significant 34.4 % and a 13.3 % drop), it should be reduced more by using fuel-efficient engines for meeting the targets of 2004 and 2009 (see Figure 1).

![Graph showing CO₂ emissions from 1995 to 2002 for petrol and diesel cars, with the 2004 Indicative Target Range: 165 g/km to 170 g/km and 2009 Target: 140 g/km.](image)

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70 KAMA represents the Korea Automobile Manufacturers Association of Hyundai Motor Company, Kia Motors Corporation, GM Daewoo Auto & Technology Company, Renault Samsung Motor Company, and Ssangyong Motor Company.

71 As recognized by the European Commission in the Recommendation of 13 April 2000 on the reduction of CO₂ emissions from passenger cars (2000/303/EC). Hereafter referred to as “The Commitment”.

72 Hereafter often referred to as “The Commission”.

73 All 2001 and 2002 CO₂ performance figures for KAMA in JR 2002 have been corrected by 0.7 % under the consideration of new test cycle, as to bring them in line with the amended Directive 93/116/EC on which the Commitment is based (see Section 2.11).

74 For the first time, official EU data is used in this Joint Monitoring Report. According to the Joint Monitoring System the monitoring has to be based on the data delivered under Decision 1753/2000/EC. According to this scheme prior 1995-2001 monitoring was based on data provided by KAMA.

75 All percentage figures are based on unrounded numbers.
E2 Trends in specific fuel consumption by fuel type (l/100km)

Specific fuel consumption (litres/100 km) of petrol engine and diesel engine is proportional to their CO₂ emissions - the lower the fuel consumption, the lower the emissions.

Total fuel consumption for petrol and diesel fuelled cars combined decreased from 8.2 l/100 km in 1995 to 7.5 l/100 km in 2001 and 7.5 l/100 km in 200276.

Petrol passenger cars, which occupied most of KAMA’s sales volumes over the reporting period, consumed about 8.1 l/100 km in 1995, which decreased afterwards to 7.5 l/100 km in 2001 and 7.5 l/100 km in 2002. Diesel cars consumed an average of 11.6 l/100 km in 1995, decreasing to 8.8 l/100 km in 2001 and 7.6 l/100 km in 2002 (see Figure 2).

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Figure 2: Trends in KAMA’s fleet in specific average fuel consumption, by fuel type (2001 and 2002 data are corrected by 0.7 % for cycle change adjustment)

E3 Trends in physical fleet characteristics

The average power for newly registered cars has increased by 4.6 % between 2001 and 2002. As regards power increase, even though fuel-efficiency improvements were made, KAMA believes that customers also sought better vehicle driveability and performance that led to the overall power increase from 65 kW in 2001 to 68 kW in 2002.

Engine capacity of petrol cars has been decreased by 0.3 %, and diesel cars decreased by 8.4 % over the monitoring period 2001 to 2002. In the case of diesel engine capacity, the medium size HSDI

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76 The following conversion factors were used for the calculation of specific fuel consumption (l/100km) from specific CO₂ emissions (g/km): petrol 23.7, diesel 26.6.
(High Speed Direct Injection) diesel engine introduced in 2001 mainly contributed to the reduction of engine capacity.

A trend analysis of the mass of vehicles cannot be carried out this year due to inconsistencies between the data provided by KAMA for the period 1995 to 2001 and the official EU data. Moreover, some of the 2002 official EU data are also inconsistent in themselves.

Although general trends in physical characteristics show an overall increase in engine power within the reporting period, total fuel consumption for petrol- and diesel-fuelled cars combined decreased with application of various technological developments.

### E4 Technical developments introduced to reduce CO₂ emissions

In addition to meeting emission regulations (EURO III & IV) and OBD (On Board Diagnostics) regulation in place in the EU, KAMA members tried to reduce CO₂ emissions and improve fuel economy with various technical developments.

KAMA members tried to reduce CO₂ emissions by applying new technologies such as advanced torque based actuator control, advanced knock control system, weight reduction, advanced petrol engine and HSDI diesel engine, reduction of engine friction, variable intake-manifold system, motor driven power steering, drag reduction, low friction tire, and 6-speed manual transmission within the reporting period.

KAMA members introduced these newly developed vehicles in the EU market from 2001. As a result, the share of diesel cars with CO₂ level of 141 - 160 g/km category has increased by 994 % (from 1 455 units to 15 919 units) over the period of 2001 to 2002. HSDI diesel engines were introduced in 2001, increasing from a 0.4 % to a 5.0 % share of total KAMA sales volume in the period 2001 to 2002; the volume will steadily increase and contribute to the remarkable reduction of CO₂ in the EU market.

In order to introduce low emission cars, KAMA members are currently developing diesel passenger cars of small displacement with common rail (2nd generation of HSDI engines) that will be launched in 2003 at the earliest.

### E5 Brief overall assessment on progress in relation to the target

Mainly due to the application of new technologies such as advanced torque based actuator control, combustion improvement, variable intake manifold system, CVVT (Continuously Variable Valve Timing) system, advanced knock control, swirl control system, and HSDI diesel engine, etc. on the EU market, a reduction of average specific CO₂ emissions was accomplished from 197 g/km to 183 g/km between 1995 and 2002.

To achieve the CO₂ emission targets agreed upon in the Commitment by 2004 and 2009, KAMA members have begun to concentrate on developing fuel-efficient car technologies such as, inter alia, 2nd generation HSDI engine, GDI (Gasoline Direct Injection) engine, CVT, weight reduction, and reduction of drag force.

77 The definition of mass used by KAMA in previous reports needs still to be checked.
78 Some Member States delivered data based on the maximum weight of the vehicle. This is inconsistent with the definitions given in Decision 1753/2000/EC.
Even though the total sales volume in 2002 dropped nearly by 19.6 %, the sales volume of petrol cars dropped by nearly 26.5 % and diesel car registrations increased by nearly 27.1 % in the period 2001 to 2002. KAMA members launched a number of more fuel-efficient car models on the EU market in 2002.

As the fleet composition in the EU is mainly composed of fuel-efficient diesel and the sales volume of diesel has been constantly increased to over 40 % of total sales, KAMA members will introduce the 2nd generation HSDI engine for small size passenger cars to reduce the CO₂ emission. To meet the targets in 2004 and 2009, it is necessary for KAMA members to increase the number of cars emitting less than 120 g/km and KAMA members have to increase their annual average reduction rate to around 3.4 % during the remaining period of the Commitment. As the Commission and KAMA agree that only with significant and additional efforts will the targets be met, KAMA members will try to invest in development of the fuel-efficient car segments to meet the target in 2004 and 2009. It should be mentioned that KAMA expected from the beginning that the reduction profile would be relatively slow initially and gather pace later.

In summary, the Commission Services and KAMA have currently no reason to believe that KAMA will not live up to its Commitment. However, KAMA has to accelerate the introduction of fuel-efficient technologies for diesel and petrol engines for this purpose.

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79 This value is the simple arithmetic average value.

LVII
5. MONITORING OF TECHNOLOGICAL DEVELOPMENTS AFFECTING THE COMMITMENT

5.1. Commitment initiatives

| 5.1.1. Brief description of current R&D programmes |
| 5.1.2. Other |

KAMA members consider investments into R&D as a key element for meeting the CO\textsubscript{2} emissions targets of 2004 and 2009. They have already started new R&D projects aiming at reducing passenger car's CO\textsubscript{2} emission as well as other emissions.

Recently, Korean government finalised plans to allow the domestic sale of diesel passenger cars from 2005. So far KAMA members launched diesel passenger cars on the EU market without the base of domestic market due to too much stringent emission regulation of diesel passenger car in Korea. Hereafter the R&D activities of KAMA members will be increased and low CO\textsubscript{2} emitting diesel passenger cars will be expected to be of relative popularity, which will remarkably contribute to CO\textsubscript{2} reduction.

5.2. Technological developments

| 5.2.1. Description of fuel efficiency characteristics of new technologies, alternative concepts |
| 5.2.2. Availability of new technologies in the EU |
| 5.2.3. Availability of alternative concepts passenger cars |
| 5.2.4. Availability of low emission passenger cars (e.g. emitting 120 g/km or less) in the EU |
| 5.2.5. Availability of innovative concept passenger cars |

KAMA members have committed themselves to achieve the target and are running several R&D programmes. KAMA is convinced that these programmes will contribute to further reducing specific CO\textsubscript{2} emission to meet the target.

The technological activities can be divided into 5 major categories; Engine Programme, Transmission Programme, After-Treatment Improvement Programme, Car Weight Reduction Programme, and Reduction of Resistances Programme.

Engine Programme

KAMA members are trying to develop higher performance and lower CO\textsubscript{2} emission engines. KAMA members have introduced various kinds of technical developments to reduce CO\textsubscript{2} emissions over the monitoring period as followings:

- Advanced torque based actuator control
- Combustion improvement
- Variable intake manifold system
- CVVT system
- Advanced knock control
- Swirl control system
Reduction of friction

HSDI diesel engine with cooled EGR and VGT (Variable Geometry Turbocharger)

The new technologies and products launched by KAMA members have resulted in recent CO₂ reduction performance. KAMA members also have strategies of CO₂ reduction with developing the fuel-efficient engines such as MPI engine, GDI engine, and HSDI engine, which have potentials of CO₂ reduction in 5-25 %, 13–33 %, and 10-30 % compared to conventional engines respectively.

Furthermore, roller rocker arm, stop-go system, and 2-stage variable valve lift system will be applied for the increase of volumetric efficiency by the end of 2003. Small displacement passenger cars with 2nd generation HSDI engine will be launched by 2003 at the earliest.

Actually KAMA members started to launch HSDI diesel cars onto the EU market from the end of 2000 and will increase the portion of such diesel cars in taking the place of petrol cars.

Transmission Programme

Transmission is one of the major factors affecting CO₂ emission. Its efficiency and speed are the main factors to be improved so as to reduce emissions. KAMA members are focusing on self-development of the CVT (Continuously Variable Transmission) for the EU market. KAMA members launched passenger cars with applied technologies such as the line-up variable control system for the improvement of efficiency with 6-speed manual transmission onto the EU market in 2002. KAMA members are also trying to develop 5-speed automatic transmission and ASG (Automated Selected Gearbox) for the EU market during the monitoring period.

After-Treatment Improvement Programme

KAMA members are investigating several after-treatment systems for fuel-efficient diesel engines to be used in the near future, e.g. 4-way catalyst and photo catalyst systems. These will be applied to different car classes such as small and/or medium size cars and KAMA expects these cars will be launched onto the EU market in near future. Development of after-treatment system in parallel with CO₂ reduction to meet the stringent emission regulation, along with European OBD system for diesel cars in the EU was accomplished at the end of 2001 and was launched in 2002.

Car Weight Reduction Programme

This programme is one of the major measures to contribute to CO₂ emission reduction. KAMA members are developing aluminium bodies and chasses for lightweight vehicles. This activity will consist of extrusion, three-dimensional bending, casting as well as tube hydro-forming. In the case of chassis, the suspension system is a promising area where new technology can be applied. Vehicle weight will be continuously reduced as long as the regulation on safety permits.

Reduction of Resistances Programme

KAMA members are trying to develop new technologies such as reduction of engine friction and motor driven power steering for reducing CO₂ emission (by 5-15 %) which will be launched into the EU market by 2003. Aerodynamic drag may be improved by reducing drag coefficient or modifying frontal area shape that have an effect on CO₂ reduction. Drag coefficient has been decreased significantly in recent years through expanded use of vehicle wind tunnel during research and development. Tire rolling resistance has been also decreased by each KAMA member’s special specification for CO₂ reduction, along with low friction silica tire, preserve tire life, ride quality,
brake distance, and handling under a variety of road conditions. KAMA members have already set to work for getting further gains of 5 - 10 % on this programme.

5.3. Description of market trends in physical fleet characteristics

There has been no significant market trend with regard to the physical fleet characteristics within the reporting period. KAMA members have achieved some improvements in new car CO2 reduction, even though most parameters have increased in general (see Section 2.4).

Averaged engine capacity decreased after 1996 to 1 507 cm³ in 2001 and increased to 1 546 cm³ in 2002.

Averaged engine power reached the peak 71 kW in 1997 and decreased to 65 kW in 2001 and then increased to 68 kW in 2002. The main contributor to CO2 decrease after 1997 is sales volume increase of petrol mini cars with engine capacities of less than 1 000 cm³. Hereafter small displacements passenger cars with 2nd generation HSDI engine will mainly contribute to CO2 decrease.

A trend analysis of the mass of vehicles cannot be carried this year due to inconsistencies between the data provided by KAMA for the period 1995 to 2001 and the official EU data. Moreover, some of the 2002 official EU data are inconsistent in themselves.


6.1. Trends in specific emissions of CO2 (g/km)

As shown in Figure 1, the average specific CO2 emissions of newly registered passenger cars from KAMA members in the EU increased from 197 g/km in 1995 to 203 g/km in 1997. After 1997 it decreased to 187 g/km in 2001 and 183 g/km in 2002. KAMA members in the EU market achieved an average reduction in specific CO2 emission of about 6.9 % over the period 1995 to 2002. Specific CO2 emission from petrol cars, which occupied most sales volumes, reached the highest (203 g/km) in 1997 and decreased afterwards due to the increase of petrol mini car (<1000 cm³) sales. But after 2001, number of diesel car sales increased to 27.7 %, which affected the reduction of CO2 emission.

Diesel cars with higher CO2 emissions due to its heavier weight showed a sharp decrease of CO2 emission within reporting period. Although the thermal efficiency of diesel engines is better than that of petrol engines, their fuel efficiency was lower for diesel than for petrol engines, due to the larger size of diesel vehicles. The overall trend in total fuel consumption shows a significant decrease from 1997 onward, mainly driven by the decrease of fuel consumption in petrol cars and by the increased sales of segment A/B diesel cars. KAMA expects that the reduction rate of CO2 emission will be definitely increased due to the increasing number of small diesel cars (see Figure 3).

The overall CO2 emission of KAMA shows a steady decrease since 1998 and the CO2 reduction rate of KAMA will be increased with increasing the number of diesel passenger cars by 2004 and 2009.
6.2. Number of newly registered passenger cars

Total new car registration by KAMA was 325,206 units in 2002, down by 18% from 2001 registrations (396,792 units). Petrol cars still represented the largest share of new registrations – 77.9% in 2002 (compared to 85.2% in 2001; see Figure 4).

The number of petrol cars with CO₂ emitting less than 140 g/km that were not shown in the EU market before 2002 reached 5,855 units (1.8% share).

The number of diesel passenger cars sold increased from 55,219 units in 2001 to 71,708 units in 2002 (up 29.9%; see Figure 4). Even though the portion of diesel passenger cars sold increased to 22.1%, the specific emission of KAMA diesel cars slightly affected the reduction of CO₂ emission due to the small portion of CO₂ emission categories less than 140 g/km. The portion of small passenger car with new diesel engine is only 5.0%.

Figure 3: KAMA's CO₂ Reduction Index (1995 = 100) (2001 and 2002 data are corrected by 0.7% for cycle change adjustment)
6.3. Fleet composition

KAMA's fleet composition has changed towards more fuel-efficient cars over the monitoring period. The fleet composition of KAMA has moved to the fuel-efficient categories with the exception of the 251-300 g/km categories. The share of this category grew by 1.3 % over the period 1995 to 2002 (from 3.1 % to 4.4 %), but decreased by 3.3 % from 7.7 % to 4.4 % over the period 2001 to 2002.

Though the number of petrol mini car sales decreased, the number of diesel passenger car in the low category of 141-160 g/km has increased from 1 455 units to 15 919 units (0.4 % to 4.9 % in total first registrations) over the period 2001 to 2002. Thus, the share of cars in the low category of 141-160 g/km has increased to 44.7 % in 2001 and 38.3 % in 2002 from 9.2 % in 1995, which mainly contributed to reducing CO₂ emission (see Figure 5). Especially the number of cars in the low categories of 140 g/km or less has reached to 5 855 units (1.8 %).

In 2002, KAMA's CO₂-related fleet composition continued to show a move towards more fuel-efficient cars, with 160 g/km or below car sales rising to 40.1 % in 2002 from 9.2 % in 1995. First registrations of vehicles of 160 g/km or below in 2002 are 130 495 units.
Total engine capacity has decreased from 1 589 cm$^3$ in 1995 to 1 507 cm$^3$ in 2001 and increased to 1 546 cm$^3$ in 2002; i.e. decreased by 2.7 % over the period 1995-2002 but increased by 2.6 % over the period 2001-2002. Petrol engine capacity reached the maximum 1 583 cm$^3$ in 1996 (against 1 568 cm$^3$ in 1995) and decreased to 1 361 cm$^3$ in 2001 and then 1 357 cm$^3$ in 2002; i.e. decreased by 13.5 % over the period 1995-2002. Diesel engine capacity reached the minimum 2 316 cm$^3$ in 1998 (against 2 735 cm$^3$ in 1995) and increased to 2 396 cm$^3$ in 2001 and decreased to 2 195 cm$^3$ in 2002. The overall trend shows some reasonable variations in engine capacity over the reporting period of 1995-2002, mainly due to a drop (-13.5 %) in petrol engine capacity and a drop (-19.7 %) in diesel engine capacity (see Figure 6).

Total engine power reached the maximum 71 kW in 1997 (against 67 kW in 1995) and decreased to 65 kW in 2001 and then increased to 68 kW in 2002; i.e. increased by 1.5 % over the reporting
period 1995-2002. Petrol engine reached the maximum 71 kW in 1997 (against 67 kW in 1995) and
decreased to 62 kW in 2002, i.e. decreased by 7.5 % over the reporting period. Diesel engine power
has substantially increased by

28.8 % within the reporting period, i.e. from 66 kW in 1995 to 85 kW in 2002 (see Figure 6).

A trend analysis of the mass of vehicles cannot be carried this year due to inconsistencies of the
data provided by KAMA for the period 1995 to 2001 and the official EU data. Moreover, the 2002
official EU data are inconsistent in themselves80.

![Figure 6a: Physical KAMA fleet characteristics for 2001 & 2002](image1)

![Figure 6b: Physical KAMA fleet characteristics 1995 to 2002 (percent of 1995 values)](image2)

6.5. Trends in new technologies in the EU

As noted in Section 1.2, KAMA members tried to apply several technologies to reduce CO₂
emission such as torque based actuator control, advanced knock control, variable intake-manifold
system HSDI diesel engine, engine & driving friction reduction and weight reduction within the
reporting period. Trends in first registrations vary across the applied technologies.

The share of cars applied with advanced torque based actuator control that could increase the engine
performance increased from 6.7 % in 1999, 8.4 % in 2000, 38.4 % in 2001, and 48.4 %81 in 2002.

The share of cars applied with knock control that also could increase engine performance increased
from 7.4 % in 1996, 13.4 % in 2000, 38.1 % in 2001, and 47.7 % in 2002.

80 Some Member States delivered data based on the maximum weight of the vehicle. This is inconsistent with the
definitions given in Decision 1753/2000/EC.

81 The rates used in Section 2.5 are based on KAMA’s estimation number of cars shipped to the EU region in the
monitoring period.
The shares of variable intake-manifold system first introduced in 2001 were 1.3 % of total KAMA first registrations in 2001 and the volume were increased to 9.1 % in 2002.

The shares of HSDI diesel engines first introduced in 2001 were 4.4 % of total KAMA first registrations in 2001 and the volume were increased to 21.3 % in 2002.

Several new kinds of technical developments introduced by KAMA to reduce CO₂ emissions over the monitoring period are as followings:

- Combustion improvement : 7.6 %
- Variable geometry timing system : 2.4 %
- 2-stage variable intake manifold system : 9.1 %
- Cooled EGR : 3.0 %
- Variable geometry turbocharger : 2.4 %
- 6-speed manual transmission : 1.0 %
- Motor driven power steering : 3.0 %
- Engine friction reduction : 7.6 %
- Drag reduction : 9.1 %
- Low friction tire : 9.1 %

Hereafter the R&D activities of KAMA members will be increased and low CO₂ emitting diesel passenger cars will be expected to be of relative popularity, which will contribute to CO₂ reduction.

6.6. Trends in low emission passenger cars in the EU

KAMA members will launch the fuel-efficient cars emitting 120 g/km or less onto the EU market in 2003 at the earliest.

6.7. Trends in alternative concepts passenger cars in the EU

KAMA members are developing HEV and planning to launch it on the EU market in near future.

6.8. Trends in innovative concept passenger cars in the EU

In 2002 the car manufacturers' associations and the Commission agreed guidelines for the acceptance of innovative concepts within the monitoring of the Commitments (see Annex 2).

6.9. Brief description of the degree of occurrence of Grey Areas between M1 and N1 vehicles

Nothing to report.
For the first time since the inception of the Joint CO2 Monitoring Reports, this 2002 report utilises data from the official EU scheme (1753/2000/EC), that is based on Member State submissions (see Annex 1). The data submitted by Member States are the official figures for the monitoring process. Until now, KAMA utilised data from the French-based association AAA (Association Auxiliaire de l'Automobile) partly supplemented by data delivered by Marketing Systems, so as to enable the annual monitoring exercises to be undertaken.

However, with official EU data becoming available, a discontinuity from the past data series exists; because of underlying differences (see below) it is not correct to simply adjoin official data for most recent years, onto KAMA's historical data.

The main dimensions of this discontinuity are:

Country Coverage: The official EU data for 2002 covers 15 Member States. Whereas, KAMA's CO2 data has not until recently included Greece and Finland (due to data unavailability).

Methodology Differences: KAMA data links registrations to one, highly analysed, vehicle specification information bank, which is used for all Member State registrations. For official EU data, each Member State has its own vehicle specification set, to which it links its national registrations; national variations in these vehicle specifications exist. A number of more specific methodological issues have been identified in relation to CO2 categories and the treatment of unknown cars which need further investigation, e.g. KAMA’s data provider try to improve incomplete data sets with the help of their databanks while Member States count only cars with complete data sets. The methodologies used by the data provider for closing gaps in the data sets are not known. Moreover there seems to be a systematic difference in the reporting of the mass of vehicles.

Registration Data Differences: Firstly, official EU data disregards car registrations with no CO2 data provided, whereas in the case of KAMA data, if no CO2 information was available or can not be provided by the vehicle specification databank, any such vehicles would be included under an "unknown" category. In past Monitoring Reports the size of "unknown versions" has been an important parameter in the evaluation of data quality. The official EU data cannot provide this information. Secondly, the registration number in Spain (19 336 units) reflected only part of the number of KAMA member’s exports (57 538 units) in 2002.

6.11. Description of measurement issues for CO2 emission factors

KAMA's CO2 emissions figures have been established according to Directive 93/116/EC83, which amended Directive 80/1268/EC. Among other changes, the new cycle includes for the first time a cold start period – the deletion of the initial 40 seconds of unmeasured engine idling prior to the commencement of the test, and consequently values for fuel consumption and CO2 emissions are higher under the new system. The implementation of this new measuring procedure has led to an

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82 This number was accumulated and estimated by KAMA. However, it should be mentioned that shipments to the EU region are not identical with the first registrations.
83 The Directive in force at the time of the KAMA Commitment
artificial average increase of the CO₂ emission figures, compared to the previously used Directive, whereas the CO₂ emissions from cars in the real world have not changed.

Since January 2001, almost all M1 vehicles up to 2 500 kg have had their CO₂ emissions measured according to the new Directive/cycle (99/100/EC). A correction factor needs to be applied to the measured CO₂ emissions of such vehicles to broadly bring them into line with the 93/116/EC procedure, which is the basis on which KAMA’s future targets were established and the basis of historical monitoring data in this report. In 2002 KAMA and the Commission reached a consensus on this correction factor adjustment; it was agreed that a 0.7 % reduction should be applied to "measured" emissions to align them with the Commitment's basis. In this report, this adjustment has been applied to 2001 and 2002 data. For future years it was also agreed that this 0.7 % adjustment should be maintained unless new data is provided by KAMA, that proves its inappropriateness.

6.12. Other issues

Nothing to report.

7. KEY ASSUMPTIONS TO THE COMMITMENT

7.1. Availability of enabling fuels

<table>
<thead>
<tr>
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Nothing to report.

7.2. Distortion of competition

<table>
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<th>Statement on implication for the Commitment and justification</th>
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Nothing to report.

7.3. Promotion of CO₂ efficient technologies

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<th>Statement on implication for the Commitment and justification</th>
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Cars with low CO₂ emission technology like lean burn engine and CVT could not be launched to the EU market although they were introduced in 1998 to the Korean market, due to the stringent emission regulations of EU. KAMA expects fuel-efficient lean burn cars (with de-NOₓ catalyst) to contribute to reducing CO₂ emission in the near future. KAMA members have high expectations for certain technologies; in particular those associated with gasoline direct injection engines.

It is the Commission's opinion that KAMA was fully aware of the emission standards laid down in the amended Directive 70/220/EC when making its Commitment.

7.4. Acceptance of innovation

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Nothing to report.
8. OTHER ISSUES

8.1. New measures affecting CO₂

Comment on impact of the issue and on implication for the Commitment

Nothing to report.

8.2. New regulatory measures

More stringent regulations of emissions, safety, and recycling can affect the effort to reduce CO₂ emission. For example, such regulations may contain legal, technical or procedural requirements that in practice could create technical or other impediments to the objective of reducing CO₂ emission. Compliance with such regulations may also increase costs for manufacturers, thereby affecting their financial situation and having an impact on the resources available for developing CO₂ efficient technologies.

KAMA anticipates that the End-of-Life Vehicle (ELV) Directive 84 and possible implementation of regulations on Pedestrian Friendly Vehicle will have adverse implications for the fuel efficiency of cars, as it may limit the use of certain light materials and technologies, while imposing a significant financial burden on KAMA members.

Other directives with major implications are the emissions Directive 70/220/EC and the fuel Directive 98/70/EC. It might well prove that the industry will be severely limited in its ability to offer widespread direct injection diesel and petrol engines simultaneously fulfilling the required NOₓ level and offering the fuel consumption improvements on the fuel qualities specified. The key point is that emissions, CO₂ and fuels are intrinsically linked, and KAMA members needs 100 % availability of fuel with less than 10 ppm or “sulphur free”, in order to meet both the stringent 2005 EURO-IV tailpipe emission standards and 140 g/km CO₂ commitment. The CO₂ effects will be assessed for fourteen regulations, which include measures on tailpipe emissions, noise, safety, security, and ELV, etc.

The Commission believes that the ELV Directive will not have any adverse effects on fuel efficiency given that it does not limit the use of any material. Experience shows that the recycling rates set by the Directive do not affect the possibility to use any material. In the Netherlands, a material recycling rate of 80 % (as requested by the Directive for 2006) has been reached in 2001 and the Dutch recycling scheme set itself the goal of exceeding the 85 % recycling target (set by the Directive for 2015) already by 2007. Similar experiences in other Member States further confirm this.

According to the Commission restrictions on heavy metals set by the Directive does not have any impact on the choice of materials and on the fuel reduction performances given that the restrictions only apply to components for which heavy-metals free substitutes are available (including electric vehicles).

The Commission draws attention to the fact that KAMA knew the EURO III and EURO IV limit values 85 at the time it signed the Commitment and that the introduction of 10 ppm fuels goes 86

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84 Directive 2000/53/EC
85 Directive 98/69/EC
86 Directive 2003/17/EC
beyond KAMA's expectation at that time, a fact that will have to be taken into account in the 2004 review.

Finally, the Commission cannot accept that voluntary commitments made by car manufacturers with regard to pedestrian safety be taken into account within the monitoring of the CO₂ Commitment.

### 8.3. Fiscal measures

Comment on impact of the issue and on implication for the Commitment

Nothing to report.

### 8.4. Breakthrough technologies

Comment on impact of the issue and on implication for the Commitment

Nothing to report.

### 8.5. Research programmes: Description and future potential

Comment on impact of the issue and on implication for the Commitment

KAMA members have committed themselves to achieve a target (140 g/km of CO₂ emission in 2009) and are running several R&D programmes to investigate methods to reduce CO₂ emission with up to 20-30 % according to the car segments.

The activities can be divided into several major categories: The Engine Programme, the Transmission Programme, the After-Treatment Improvement Programme, the Car Weight Reduction Programme, and the Reduction of Resistances Programme (see Section 1.2), which will be combined for reducing CO₂ emission and launched step by step to the EU market in near future.

In addition to the reduction of car weight, KAMA members are trying to develop new technologies such as CVVT, advanced reduction of engine friction, reduction of resistances (running and rolling) for reducing CO₂ emission, motor driven power steering which were launched into the EU market in 2002 and small vehicle with 2nd HSDI engine, roller rocker arm and stop-go system for reducing CO₂ emission which will be launched into the EU market by 2003 at the earliest.

### 8.6. Other measures - telematics, infrastructure, education

Comment on impact of the issue and on implication for the Commitment

KAMA members will consider implementing the driver education activities for more environmentally friendly driving in the EU. KAMA believes that such initiatives will encourage customer acceptance of CO₂ efficient technology and are one of the contributors to “market changes linked to technical development” as specified in the Commitment.

KAMA also believes that measures such as the promotion of trade-in purchase of new cars, presentation of correct and proper car maintenance methods, driver training, optimisation of infrastructure, effective and efficient land use, and efforts to achieve a smoother traffic flow by using ITS will have a beneficial effect on CO₂ reduction. KAMA thinks that such measures should therefore be embraced in a positive manner under government lead and with the co-operation of the industrial sectors involved.
8.7. Economic situation of the car industry

Comment on impact of the issue and on implication for the Commitment

The Commission is aware of the problematic economic situation of some Korean car makers. However, even though the economic situation in Korea has been getting recovered gradually, the effect of economic crisis at the end of 1997 shows the low rate of CO₂ reduction of cars from KAMA members; actual investment for R&D for fuel-efficient car was very difficult during the monitoring period.

KAMA notes that the development costs for technologies will be higher for their members than other associations that have large sales volume in the EU market, which is a disproportionate burden of investment to KAMA members during past several years after economic crisis. In these circumstances, KAMA requests that such economic factors may have to be duly considered in the monitoring of CO₂ emission reduction from passenger cars.

The Commission is aware of the difficult economic situation of some Korean car manufacturers. The Commission draws attention to the fact that one Korean manufacturer, contributing a significant market share of KAMA on the EU market, achieved high profits in 2002 and Korea's auto trade surplus remain at high level.

The Commission draws attention to the fact that the world market for passenger cars is fractionated in many respects, not just with regard to CO₂ emission reduction requirements, and a large number of regional regulations apply. Furthermore, on the EU market all manufacturers require equivalent efforts, and in this respect the Commitments guarantee a level playing field. The situation described by KAMA is not new since the Commitment was made.

9. CONCLUSIONS

9.1. Progress statement on delivering the Commitment

KAMA members are encouraged to concentrate on CO₂ emission reductions by developing fuel-efficient cars. KAMA reduced the average CO₂ emission of its new passengers car fleet registered (petrol and diesel) in the EU market to 183 g/km in 2002, from 197 g/km in 1995 and 187 g/km in 2001. This represents a reduction of 6.9 % over the whole monitoring period of 1995-2002 and 1.8 % over the period 2001 to 2002.

When the fleet composition is considered (see Section 2.3), an outstanding feature is the sharp increase of the share of low CO₂ cars emitting less than 160 g/km (40.2 %), which shows the endeavour and will of KAMA members to meet the Commitment.

9.2. Statement on expected future progress of the Commitment

It is encouraging to see that in 2002 KAMA's CO₂-related fleet composition continued to show a move towards more fuel-efficient cars with 160 g/km or below car sales rising to 40.2 % from 9.2 % in 1995. However, the estimated intermediate target range of 165-170 g/km in 2004 and the final target value of 140 g/km in 2009 require further serious efforts by KAMA members. Importantly, and as agreed upon, the targets will mainly be achieved by technological developments affecting different car characteristics and market changes linked to these developments. Regarding technological developments, KAMA will aim at achieving a high share of new cars equipped with CO₂ efficient technologies.
Although the current progress in fuel-efficient car technology development of KAMA members is relatively slower than that of European automobile manufacturers, they will increase the portion of fuel-efficient cars and introduce the 2nd generation HSDI engines for small size passenger cars by 2003. Hereafter the R&D activities of KAMA members will be accelerated and low CO₂ emitting passenger cars, such as 2nd generation HSDI engines for small size passenger cars and HEV, will be expected to be of relative popularity, which will remarkably contribute to CO₂ reduction.

KAMA members must increase their annual average reduction by about 6 g/km with developing cars emitting less than 120 g/km to meet the CO₂ target of 2004 and 2009, and expect the reduction rates will be increased with the acceleration of technology development as time goes on.

In summary, the Commission Services and KAMA have currently no reason to believe that KAMA will not live up to its Commitment. However, KAMA has to accelerate the introduction of fuel-efficient technologies for diesel and petrol engines for this purpose.
DATA ANNEXES (2002)

ANNEX 1

A1: SPECIFIC FUEL EFFICIENCY (l/100km) AND EMISSIONS OF CO₂ (g/km) AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE FOR THE EU AND EACH MEMBER STATE

A2: THE DISTRIBUTION OF CO₂ EMISSIONS (g/km) IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE

A3: THE DISTRIBUTION OF AVERAGED POWER AND ENGINE CAPACITY OF NEW PASSENGER CARS FOR EACH FUEL TYPE FOR THE EU-15 AND EACH MEMBER STATE

ANNEX 2: Monitoring Rules for Innovative Concepts
ANNEX 2: MONITORING RULES FOR INNOVATIVE CONCEPTS

ANNEX 1: 2002 Monitoring data

A1: SPECIFIC FUEL EFFICIENCY (l/100km) AND EMISSIONS OF CO₂ (g/km)\(^{87}\) AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE FOR THE EU AND EACH MEMBER STATE

KAMA MEMBERS - 2002

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\(^{87}\) The emission-values of CO₂ are corrected by 0.7% for test cycle change.

\(^{88}\) Retrofitted vehicles
A2: THE DISTRIBUTION OF CO₂ EMISSIONS (g/km) IN THE NEW PASSENGER CAR FLEET\textsuperscript{89} FOR EACH DIFFERENT FUEL TYPE\textsuperscript{90}

KAMA MEMBERS - 2002

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\textsuperscript{89} The following vehicles were suppressed due to possible data implausibility: 628 petrol cars with 119 gCO₂/km as an average from the category 101-120 gCO₂/km, 3 petrol cars emitting 845 gCO₂/km as an average from the category >450 g CO₂/km.

\textsuperscript{90} The total number of vehicles based on official EU data is smaller than the total number of vehicles according to the data of the car manufacturers association because the Member States submit exclusively data about those vehicles for which corresponding CO₂ data are available in their data base.
### A3: The Distribution of Averaged Power and Engine Capacity of New Passenger Cars for Each Fuel Type for the EU-15 and Each Member State

KAMA Members - 2002

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91 Mass data not shown due to possible inconstancies in Member States’ deliveries
ANNEX 2: Monitoring Rules for Innovative Concepts

JOINT AGREEMENT ON THE GUIDELINES FOR THE ACCEPTANCE OF INNOVATIVE CONCEPTS WITHIN THE MONITORING OF THE COMMITMENTS OF ACEA, JAMA AND KAMA ON CO₂ REDUCTION FROM PASSENGER CARS

A. General aspects:

a) The basis of the assessment is the text of the commitments, and any decision must be closely linked to monitoring-related questions of the Commitment, and must be relevant for the quality of the monitoring.

b) Political aspects should also be taken into account, e.g. possible reactions of Council, EP, NGO and the general public, and all sides should avoid undermining the credibility of the Commitments.

c) Innovations in general should not be hampered, and technical passenger car innovations, e.g. lightweight vehicles, should be promoted. However, as a replacement it should be a “bona fide” and in principle a one-for-one replacement of a conventional vehicle.

d) Any definition or criteria of “innovative concept” set out in this document is exclusively for the purpose of the monitoring of the Commitment on CO₂ emission from passenger cars. They are not intended to be used in any other context or be seen by the auto industry as an indication by the Commission to establish any additional category of cars for the present or the future.

e) The “innovative concept” vehicles must meet a number of technical and environmental criteria.

B. Specific criteria:

i. The “innovative concept” should meet at least the general criteria of M-class vehicles (Motor vehicles with at least four wheels used for the carriage of passengers)

ii. The CO₂ emissions should be measurable in accordance with Directive 80/1268/EC and a CO₂ figure should be provided by the manufacturers (even if these vehicles are currently not covered by this Directive)

iii. The “innovative concept” should meet at least the emissions limit values for regulated pollutants applicable to M1 vehicles

iv. The “innovative concept” vehicle should demonstrate passive and active safety appropriate to its intended use

92 “The acceptance by the Commission of innovative concepts for vehicles replacing conventional cars in short-haul traffic as contributing factors to comply with the Commitment.”

93 Innovative concepts for vehicles replacing conventional cars will be counted towards the achievement of this CO₂ emission target even if they are not included in the category M1 or are not currently covered by Directive 93/166/EC

94 In exceptional cases three wheel vehicles might be included, subject to a case-by-case decision
v. The “innovative concept” should have a minimum top speed that allows its usage on all types of public roads.

vi. The “innovative concept” should comply with the ELV Directive.

C. Monitoring rule

1. Vehicles – or natural developments of such vehicles - which were on the market before 1995 are not considered as “innovative concepts”.

2. The associations shall show clear evidence that the innovative concept it proposes is marketed and promoted to end users as a replacement to a conventional car in short haul traffic.

3. Innovative concepts have to replace conventional cars. The car industry has to provide evidence of replacement numbers. If such evidence cannot be provided on at least 50 % of the registrations, a maximum of 100 000 units on the total EU market will be taken into account.

4. In the monitoring report “innovative concepts” will be treated in a separate chapter.

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95 E.g., the usage of some roads require minima speeds