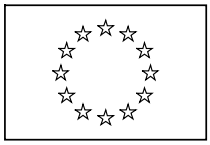

COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMISSION STAFF WORKING PAPER

Monitoring of ACEA's Commitment on CO_2 Emission Reduction from Passenger Cars (2001)

Monitoring of JAMA's commitment on CO_2 Emission Reduction from Passenger Cars (2001)

Monitoring of KAMA's Commitment on CO_2 Emission Reduction from Passenger Cars

(2001)

Final Reports
25 June 2002

{COM(2002)693 final}

Monitoring of ACEA's Commitment on CO_2 Emission Reduction from Passenger Cars (2001)

Final Report
25 June 2002

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

Monitoring of ACEA Commitment[1] on CO_2 Emission Reduction from Passenger Cars
JOINT REPORT OF ACEA AND THE COMMISSION SERVICES[2]: YEAR 2001 REPORT

ES SUMMARY OF PROGRESS IN DELIVERING THE COMMITMENT

E1 Trends in specific emissions of CO_2 (g/km)

ACEA reduced the average specific CO_2 emissions of its new car fleet registered within the EU (petrol + diesel) to 164 g/km[3,4] in 2001, from 169 g/km in 2000. The comparable figure in 1995 was 185 g/km (see Figure 1). In the period 1995-2001[5], ACEA cut its new car average CO_2 emissions by 11.4% that represents an average reduction of 1.9% a year[6] (about a 2.5% reduction in 2001[7]).

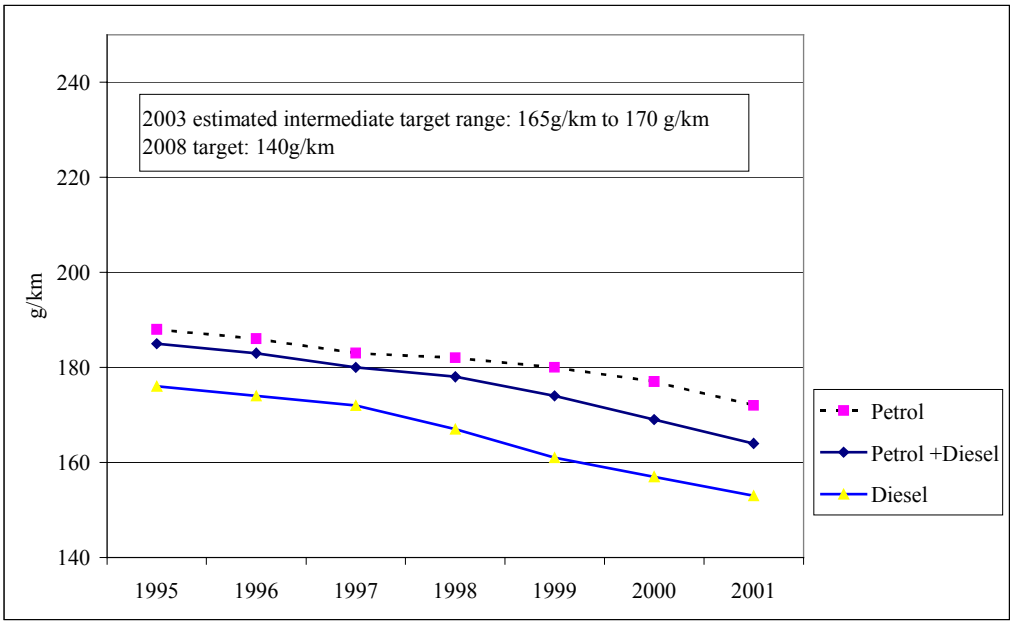

Figure 1: EU Trends of ACEA's Fleet in Specific Average Emissions of CO_2

The average CO_2 emissions of new gasoline-fuelled cars fell to 172 g/km in 2001 (from 177 g/km in 2000); for diesel-fuelled cars there was a reduction to 153 g/km (from 157 g/km in 2000). Between 1995 and 2001, the CO2 emissions of gasoline cars were down by 8.5%, and those from diesel cars by 13.1%.

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[1] 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"

[2] Hereafter often referred to as "The Commission"

[3] All 2001 CO2 performance figures have been lowered by 1% for M1 vehicles up to 2500 kg by ACEA for the estimated effects of the mandatory drive cycle change, progressively introduced from January 2000, so as to bring them in line with the amended Directive 93/116/EC on which the Commitment is based (see Section 2.11). Whereas figures for the year 2000 and before have remained unchanged. The Commission considers a correction factor of 0.7% as justified. Moreover, the Commission considers it as unjustified to apply the correction factor to the 2001 fleet because an unknown fraction of new registrations (mainly end of series vehicles) concerns vehicles that have been tested under the old cycle. ACEA draws attention to the fact that the unadjusted value would be 166 g/km; thus very close to the adjusted one.

[4] All ACEA figures include Rover. However in 2001 Rover ceased to be an ACEA member, and - according to ACEA - the 2001 total figure would be about 0.1 g/km lower if Rover were excluded. The repercussions on previous years have not been studied yet.

[5] Alternatively fuelled vehicles are not included in the specific CO2 emission figures quoted in this report. Their exclusion will, however, have no impact at all on average specific CO2 emissions values shown in this report (see chapter 2.5).

[6] This value is a simple arithmetic average, and throughout the text simple arithmetic averages are used. All percentage figures are based on the rounded full specific emission numbers; for this purpose standard rounding rules are applied.

[7] The reduction percentage in between the years 2000 and 2001 cannot be exactly specified as Year 2001 figures have been fully adjusted for the adverse effects of the cycle change (see footnote 3), but Year 2000. If the unadjusted figures were taken for both years the reduction percentage was 1.8 %.

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

Average fuel consumption in 2001 was 6.7 l/100km for new petrol and diesel registered cars combined, down from 6.8 l/100km in 2000. For petrol driven cars the corresponding values were 7.3 *l*/100km in 2001, down from 7.4 l/100km in 2000. For diesel cars, average fuel consumption of new registrations was 5.8 l/100km in 2001, down from 5.9 l/100km in 2000.

Over the period 1995 and 2001, new petrol cars and new diesel cars reduced their average fuel consumption from 7.9 l/100km to 7.3 l/100km and 6.6 l/100km to 5.8 l/100km, respectively (see Figure 2). The average fuel consumption for petrol and diesel fuelled cars combined fell from 7.6 l/100km to 6.7 l/100km.

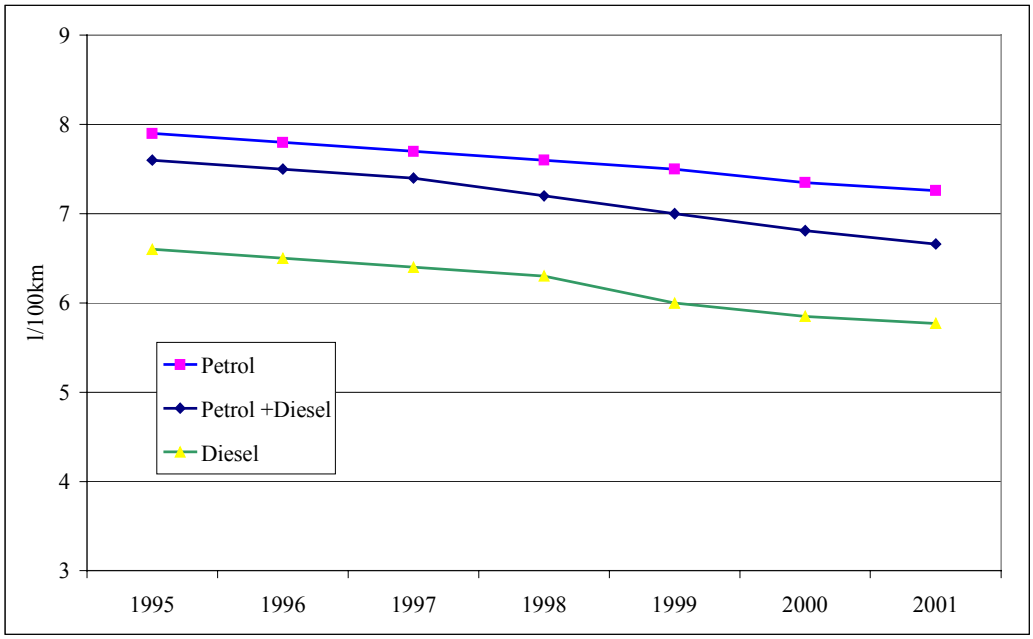


Figure 2: Trends in ACEA's Fleet in Specific Average Fuel Consumption, by Fuel Type

E3 Trends in physical fleet characteristics

ACEA has achieved improvements in new car CO2 performance even with increases in other physical fleet characteristics. Overall figures for average car mass, engine capacity and power showed an increase in 2001 with respect to 2000 (by 0.8%, 1.0% & 4.2% respectively).

Since 1998, stability in some car characteristics has occurred; for example, petrol car mass has been levelled-off, and diesel engine capacity has been stabilised (with a reduction recorded in 2001 compared to 2000).

E4 Technical developments introduced to reduce CO_2 emissions

2001 saw the introduction, or increased application, of a wide range of technical developments by ACEA manufacturers. Examples include: 2-step variable valve lift, valvetronic, fully variable intake manifold, 2nd generation of common rail injection (high pressure), a new generation of bio-fuelled vehicles, series production of CNG single-fuel vehicles, application of advanced diesel technology to small cars, 6-speed automatic gearbox, along with increased application of CVT, robotised gearboxes, GDI, 6-gear manual boxes, electric power steering, route guidance systems etc.

Technical advances by ACEA manufacturers resulted in a continued strong upward trend in fuel-efficient car sales. Over 2.8 million ACEA cars were sold in 2001 with CO2 levels of 140 g or less, a growth of almost 40% on 2000; such cars accounted for 23% of sales (petrol + diesel). In 2001 ACEA built 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 g CO2/km or less"), with almost a doubling of its sales (to 306,514 units) of 120 g or less cars on the prior year.

E5	Brief overall assessment on progress in relation to the target

In 2001, ACEA reduced the average CO2 emissions of its new car fleet to 164 g/km; this represents about a 2.5% cut from 2000, and 1.9 % per year since 1995. Its recent CO2 performance has, in fact, exceeded ACEA's expectation. Technologies have been commercialised on a very large scale, and the enhanced fuel efficiency combined with other attractive product attributes has proved a particularly "interesting package". This was particularly the case for the new generation of technically-advanced, highly fuel-efficient and competitive direct-injection diesels.

Even so, to meet the target of 140 g/km in 2008 ACEA must increase its annual average reduction rate to about 2.1% during the remaining period of the Commitment (see Figure 3). It should be mentioned that back in 1998 ACEA expected that the reduction profile would be relatively slow initially and gather pace later. ACEA considers the earlier than expected delivery of CO2 reductions as a confirmation of hopes for quick results, which was one of the benefits of the voluntary approach.

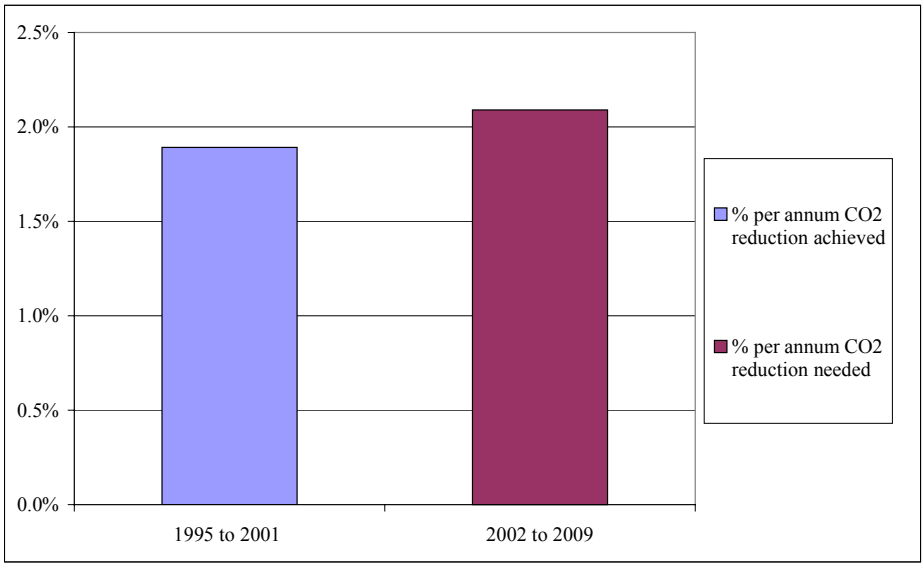


Figure 3: Annual reduction rates achieved and necessary to be achieved in future

Latest figures show that ACEA's CO_2 performance is consistent with achieving the 2003 estimated intermediate target range, 165 -170 g/km. This is further evidence of ACEA's determination to meet the 2008 CO2 target of 140 g/km, see for example ACEA's strong sales expansion of 140 g/km cars or less.

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

1. MONITORING OF TECHNOLOGICAL DEVELOPMENTS AFFECTING THE COMMITMENT[1]

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, CO_2 reduction remains a high priority in R&D expenditures, as well as in product and process planning and development. Achievement of technological breakthroughs is seen as key to CO_2 abatement. 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 due to competitive reasons to review individual manufacturer R&D programmes as part of the monitoring report.

In addition, as set-out in prior monitoring reports, ACEA and its sister body EUCAR set-up, in 1998, a collaborative, pre-competitive automotive R&D programme on medium and long-term technologies for CO_2 reduction. This programmes, called CO2perate, reflects the research interests of the participating companies, and serves to illustrate key areas of R&D activity (see Section 4.5).

ACEA's Life Cycle Assessment project mentioned in the last report is still ongoing.

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

European manufacturers continue to gear research and product & process development towards attaining the 140 g CO2/km target by 2008, with direct injection ultra lean burn engines being seen as a key area of fuel-efficient technology. Since 1998, ACEA's single most important technological achievement has been the successful introduction, onto the EU market, of direct injection diesel engines, followed by the launch of a new generation of technically-advanced diesels notably incorporating highly efficient unit injector and common rail technology. Recently, this technology has also been applied to small cars.

The new technologies and products launched by ACEA have resulted in recent CO2 reduction performance exceeding ACEA's expectation. Technologies (such as high-pressure injection diesel engines) have been commercialised on a very large scale, and have combined enhanced fuel efficiency with other attractive product attributes. It would seem that this package has proved particularly "interesting", and has driven the recent exceptional CO2 performance.

However, ACEA wishes to state that there is no guarantee that future product developments will be as well received by the market as introductions over recent years -- for example, in the last monitoring report ACEA expressed cost, market acceptability and other uncertainties associated with gasoline direct injection technology.

2001 saw the introduction of a wide range of technical developments to reduce CO2 emissions by ACEA manufacturers; examples include:

- 2-step variable valve lift,
- valvetronic,
- fully variable intake manifold,
- 2nd generation of common rail injection (high pressure),
- application of advanced diesel technology to small cars,
- 6-speed automatic gearbox,

Furthermore, 2001 saw increased application of: CVT, robotised gearboxes, GDI, 6-gear manual boxes, electric power steering, route guidance systems etc..

In addition (but not included in the CO2 figures reported here) ACEA sales of alternative-fuelled vehicle (AFVs) grew to 18,080 units in 2001 (an increase of over 4.6% on 2000) - as its manufacturers continued their on-going development of such vehicles. In particular, 2001 saw the launch of a new generation of bio-fuelled vehicles - notably flex-fuel bio alcohol/ethanol vehicles - and a new generation of methane-gas fuelled bi-fuel vehicles. Also there was series production of CNG, single-fuel vehicles.

Technical advances by ACEA manufacturers resulted in a continued strong upward trend in fuel-efficient car sales. Over 2.8 million ACEA petrol & diesel cars were sold in 2001with CO2 levels of 140 g or less, a growth of almost 40% on 2000; such cars accounted for 23% of sales (petrol + diesel). In 2001, ACEA built 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 g CO2/km or less"), with almost a doubling of its sales of 120 g or less cars (to 306,514 units). 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 improvements in new car CO2 performance even with increases in other physical fleet characteristics. Overall figures for average car mass, engine capacity and power showed an increase in 2001(by 0.8%, 1.0% & 4.2% respectively).

Since 1998 stability in some car characteristics has occurred; for example, petrol car mass has plateaued and diesel engine capacity has stabilised (with a reduction recorded in 2001 compared to 2000).

2. STATISTICAL MONITORING (1995-2001)

2.1. Trends in specific emissions of CO_2 (g/km)

As shown in Figure 1 (recall chapter E1, including footnotes), on an EU-wide basis, ACEA reduced the average CO_2 emissions of its new car fleet (petrol + diesel) to 164 g/km in 2001[8], from 169 g/km in 2000, and from 185 g/km in 1995.

Over the period 1995 to 2001, ACEA has cut its new car average CO_2 emissions by 11.4%, and maintained an unbroken downward trend. Since 1995 an average reduction of 1.9% a year has been achieved (about 2.5% reduction in 2001); in order to meet the target of 140 g/km in the year 2008 an annual average reduction rate of about 2.1% has to be achieved[9] during the remaining period of the Commitment (recall Figure 3).

The average CO_2 emissions of gasoline-fuelled cars were reduced to 172 g/km in 2001 (from 177 g/km in 2000); for diesels there was a reduction to 153 g/km (from 157 g/km in 2000). Between 1995 and 2001, the CO_2 emissions of gasoline cars were down by 8.5%, and those of diesels by 13.1%.

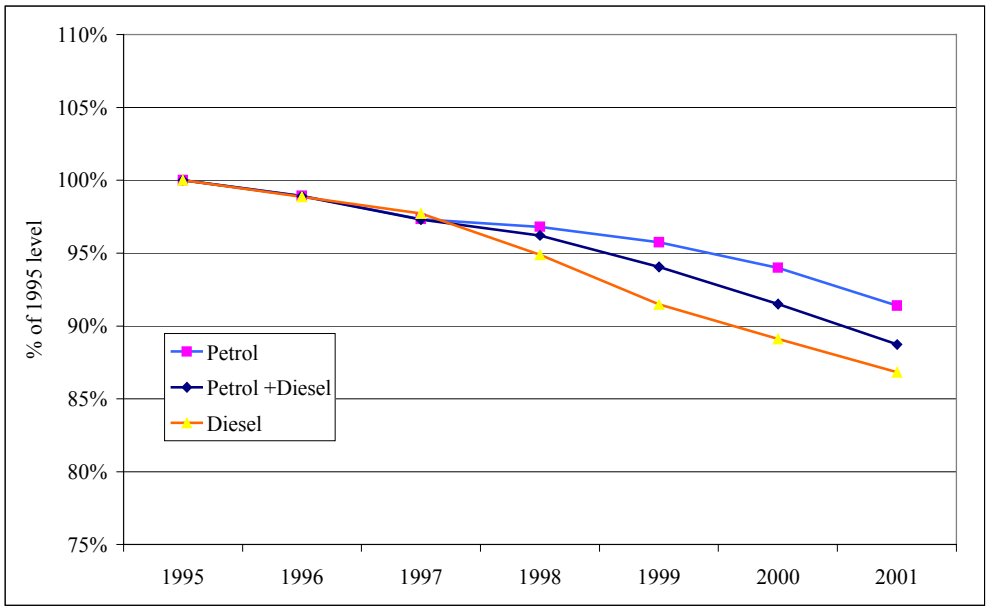


Figure 4: ACEA's CO_2 Reduction Index (1995= 100)

As set-out in Section 1.2, ACEA has built on the successful introduction of direct injection diesel engines which was followed by the launch of a new generation of technically-advanced diesels notably incorporating highly efficient unit injector and common rail technology. Recently, this technology has also been applied to small cars. The new diesels are highly competitive and fuel-efficient products, with strong consumer benefits.

2.2. Number of newly registered passenger cars

In 2001, ACEA new car sales in the EU amounted to 12552498 units, up 2.7% on previous year. ACEA's market share of total EU passenger cars was 87% (including Rover). Over the period 1995-2001 new registrations increased by 22.6%.

Gasoline car sales totalled 7307284 units in 2001, a 1.8% decrease on the previous year. In 2001, such vehicles represented 58.2% of total car sales by ACEA members. The number of diesel cars sold totalled 4941638 in 2001, which represented 39.4% of total car sales by ACEA members. (see Figure 4).

[8] See section 2.11 which discusses the correction of the presented data.
[9] The text gives the arithmetic average; for a constant year on year reduction, the value would be 2.2% per year

The number of cars equipped with other fuel types (AFVs) increased by 4.6% in 2001; however, in relation to total sales, these vehicles remained relatively small in 2001 (18,080 units, a 0.14% share)[10].

New registrations in Member States are shown in the Annex.

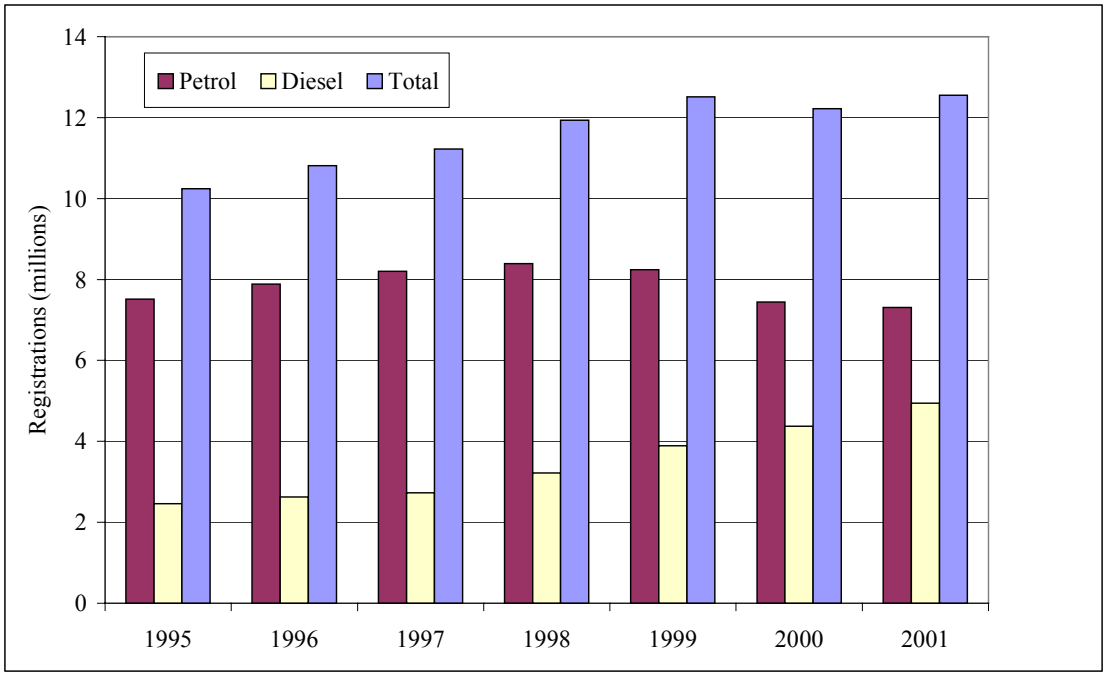


Figure 5: Number of Newly Registered Passenger Cars by ACEA [11]

2.3. Fleet Composition

The graph below shows ACEA's fleet composition for the year 2001 and the reference year 1995.

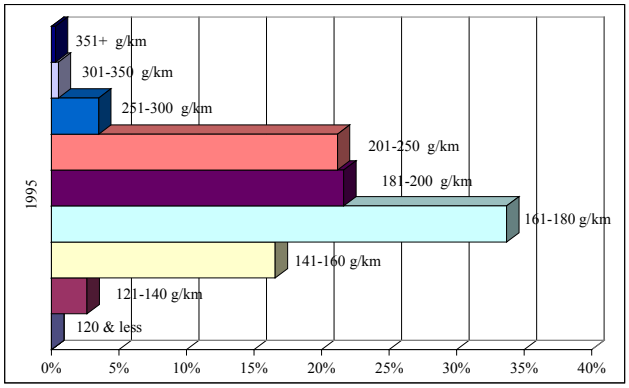


Figure 6a: ACEA's Fleet Composition per CO_2 Category in Shares of Total (petrol + diesel) in 1995

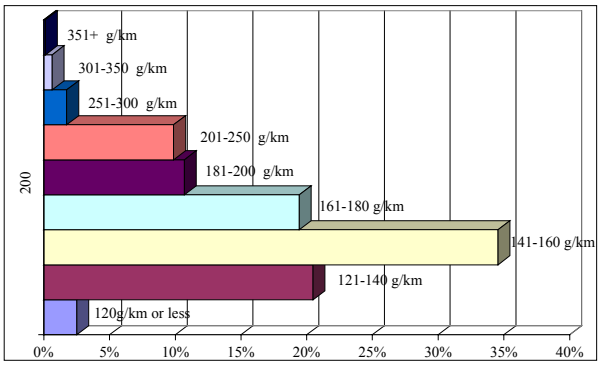


Figure 6b: ACEA's Fleet Composition per CO_2 Category in Shares of Total (petrol + diesel) in 2001

[10] AFVs are not included in the CO2 emission figures quoted in this report. However, the influence of AFVs' on the fleet averages is still negligible. In contrast to the data delivered in previous years the joint work Member States and the Commission on the implementation of Decision 1753/2000 aims at including AFVs from the reporting year 2002 onwards.

[11] The difference between the "total" registrations and the "diesel" + "petrol" registrations is due primarily to the unknown vehicles and to a minor extent due to AFVs.

In 2001, ACEA's CO_2-related fleet composition continued to show a strong move towards more fuel-efficient cars, with 140 g or below car sales rising by almost 40% on 2000. ACEA members sold over 2.8 million cars of 140 g or below in 2001 (up by over 970% on 1995). These cars accounted for over 23% of total petrol & diesel sales in 2001, up from 17% in 2000, and 2.6% in 1995. ACEA sales of cars of more than 160 g fell by more than 13% in 2001 on the prior year (and by 35.5% compared to 1995); as a proportion of total ACEA sales such cars decreased from 80.8% in 1995, to 50.7% in 2000 to reach 42.5% in 2001. (see Figure 6c)

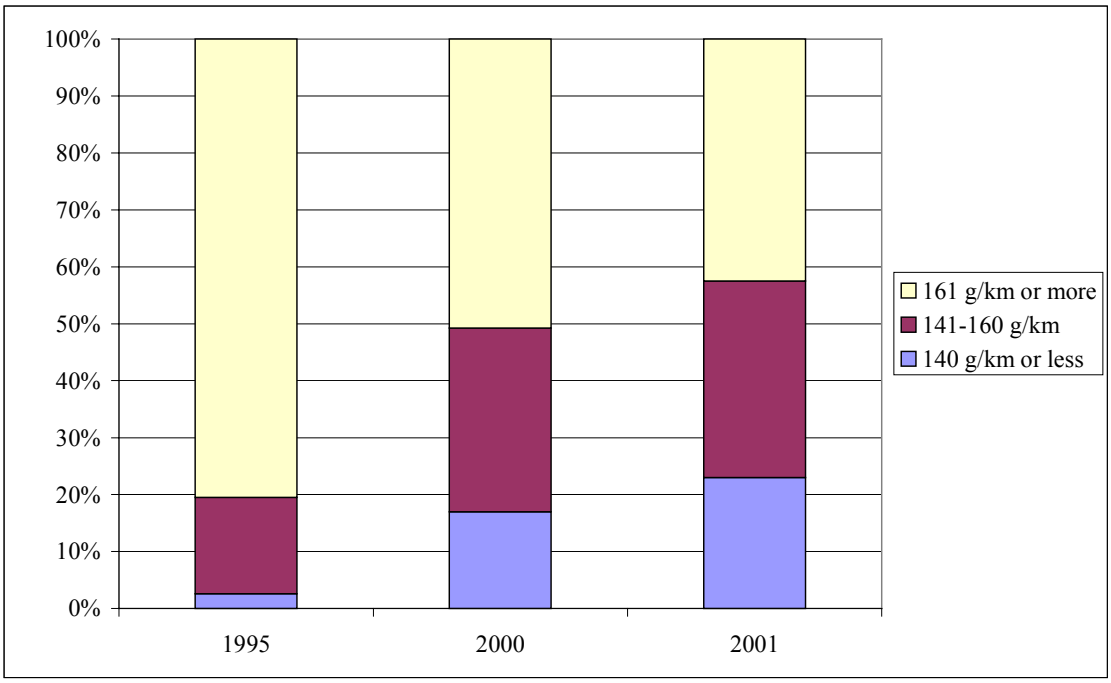
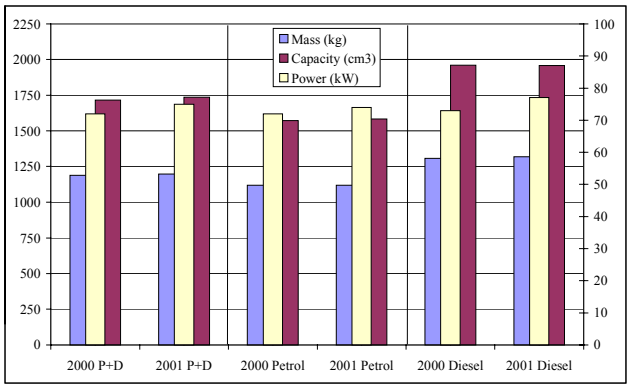


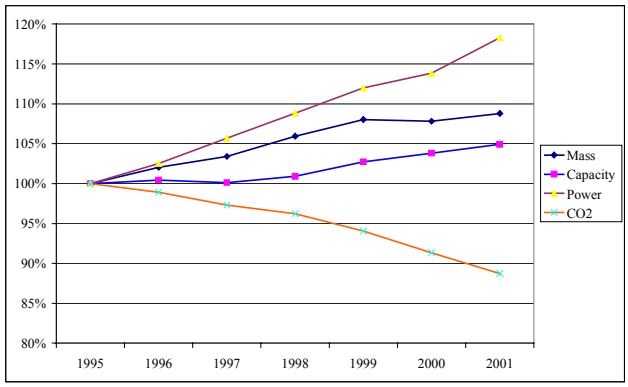
Figure 6c Change in ACEA's Fleet Composition between 1995, 2000 and 2001 by "aggregated CO_2 Categories":

2.4. EU trends in physical fleet characteristics

See Section 1.3 and Figure 6a and b below.



Figures 7a: Physical ACEA fleet characteristics for 2000 & 2001



Figures 7b: Physical ACEA fleet characteristics 1995 to 2001 (percent of 1995 values)

In the year 2001, the average car mass was slightly higher than in 2000, as were engine capacity and engine power (See Figure 7).

Average total automobile mass increased to 1198 kg in 2001 from 1188 kg in 2000. Over the period 1995 to 2001 the mass increased by 8.8% (1,101 kg in 1995). Gasoline automobiles' average mass remained the same for 2000 to 2001. Over the period 1995 to 2001, gasoline vehicles' average mass increased by 4.7% - from 1068 kg in 1995 to 1118 kg in 2001. Diesel automobiles' average mass increased from 1308 kg in 2000 to 1318 kg in 2001. Over the 1995 to 2001 period diesel mass increased by 9.5% (1,204 kg in 1995). No data is available on the average mass of vehicles in the 'Other Fuels' category.

Total engine capacity for petrol and diesel combined increased by 1.0% between 2000 and 2001. Over the period 1995 to 2001, engine capacity increased by 4.9%, from 1654 cm^3 in 1995 to 1735 cm^3 in 2001. Gasoline engine capacity increased by 0.7% between 2000 and 2001, and increased by 1.3% over the 1995-2001 period, from 1564 cm^3 in 1995 to 1584 cm^3 in 2001. Diesel engine capacity fell by 0.1% in 2001, while rising by 1.6% over the 1995-2001 period, from 1928 cm^3 in 1995 to 1959 cm^3 in 2001.

Total engine power increased by 4.2% between 2000 and 2001. Over the period 1995 to 2001, power increased by 19%, from 63 kW in 1995 to 75 kW in 2001. Gasoline engine power increased by 2.8% in 2001. Over the 1995 to 2001 period gasoline power increased by 13.8%, from 65 kW in 1995 to 74 kW in 2001. Diesel engine power increased by 5.5% in 2001. Over the 1995 to 2001 period diesel power increased by 28.3%, from 60 kW in 1995 to 77 kW in 2000.

Even with these trends in physical characteristics (see Figure 6b), ACEA's technical improvements more than compensated and delivered sustained improvements in new car CO_2 performance (with a cut of some 11.4% over the 1995-2001 period).

Since 1998, stability in some car characteristics has occurred; for example, petrol car mass has been levelled-off, and diesel engine capacity has been stabilised (with a reduction recorded in 2001 compared to 2000).

2.5. Trends in new technologies in the EU

As noted in Sections 1.2, 2001 saw the introduction or increased application of a wide range of technical developments to reduce CO2 emissions by ACEA manufacturers.

A key ACEA technological achievement has been the successful introduction, onto the EU market, of direct injection diesel engines, followed by the launch of a new generation of technically-advanced diesels notably incorporating highly efficient unit injector and common rail technology. Such products are highly competitive with strong driveability and fuel economy benefits. Recently, this technology has also been applied to small cars. In 2001, the diesel market share increased to 39.4% (up from 35.8% in 2000), continuing the growth seen since 1998, the year when the first direct injection diesel was launched.

Also as noted previously, ACEA manufacturers continued their on-going development of AFV vehicles; in particular, 2001 saw the launch of a new generation of bi-fuelled vehicles. According to ACEA AFV sales grew to 18,080 units in 2001, up by more than 4.6% on the prior year, when ACEA sales totalled 17283 units (see Figure 7).

It should be noted that the CO_2 monitoring data contained in this report does not include the CO_2 benefits of these AFVs[12].

During 2001 ACEA has worked jointly with the Commission to develop future monitoring guidelines in a number of areas, including bi-fuel CNG & LPG cars, and electric & hydrogen vehicles (see Section 2.10).

[12] Although the influence of AFVs' on the fleet averages are currently still negligible, Member States and the Commission aim at including AFVs from the reporting year 2002 onwards.

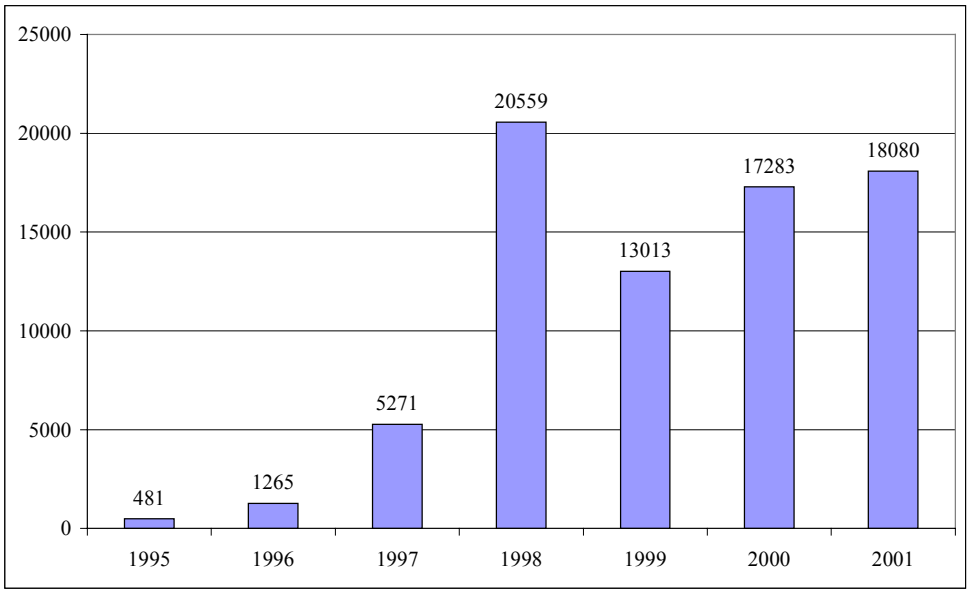


Figure 7: ACEA AFV sales (units per year)

2.6 Trends in low emission passenger cars in the EU

In 2001 ACEA built 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 g CO2/km or less"), with almost a doubling of its sales of 120 g or less cars (see Figure 8). In 2000, ACEA manufacturers achieved this commitment, by bringing to market more than 20 models that achieved 120 g or less - with sales of almost 160,000 units. This major effort was augmented in 2001 with ACEA manufacturer sales of such cars totalling over 306,500 units; these cars accounted for over 2.5% of total ACEA (petrol + diesel) sales in 2001 (compared to 1.3% in 2000).

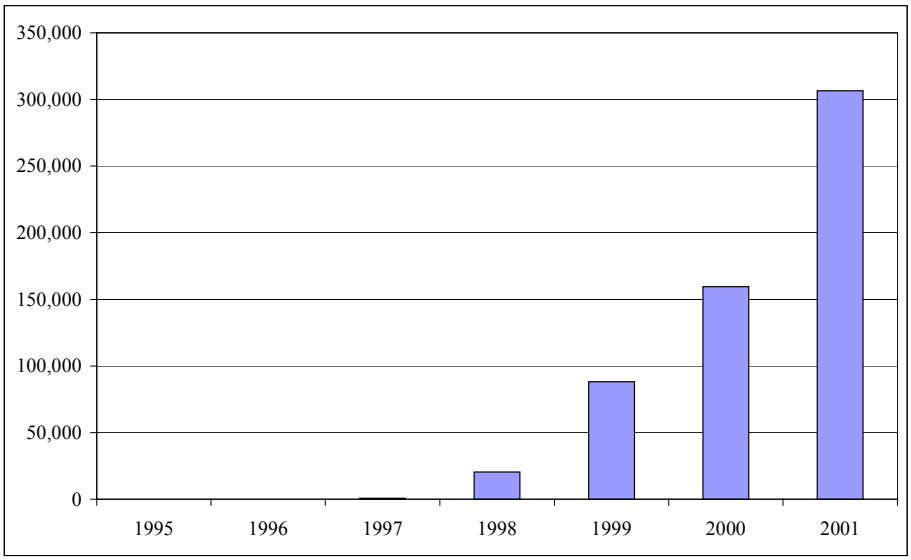


Figure 8: ACEA Sale of Vehicles with Specific Emissions of 120 g/km or less (unit sales)

2.7 Trends in alternative concepts passenger cars in the EU

Over recent years, certain ACEA manufacturers introduced electric vehicles onto the EU market.

During 2001 ACEA has worked jointly with the Commission to develop future monitoring guidelines in a number of areas, including on electric & hydrogen cars, and on direct/indirect CO2 emissions (see Section 2.10).

2.8 Trends in innovative concepts passenger cars in the EU

During 2001 the car manufacturers' associations have worked jointly with the Commission in an attempt to develop future monitoring guidelines for innovative concepts[13]. Good progress could be made and a final set of criteria will most likely be adopted in 2002.

2.9 Brief Description of the degree of occurrence of Grey Areas between M1 and N1 vehicles

The number of M1 vehicles potentially registered as N1 (about 270 000) was around 2.2% of total new registrations.

2.10 Data sources, data methods and data confidence levels

As in previous years ACEA purchased the data, for the 2001 report, from the French-based association AAA (Association Auxiliaire de L'Automobile), a recognised high-quality data provider. In line with the "Exchange of Letters" on monitoring ACEA continued to provide CO2 data into the monitoring process, as the official EU scheme (1753/2000/EC) had not reached a stage where data provided by Member States could become the basis for monitoring progress (see below)[14]. By purchasing and providing this data ACEA is therefore enabling these annual monitoring exercise to be undertaken. ACEA has high confidence in AAA data, notably as regards its accuracy and EU-wide consistent approach - both of which are essential ingredients of any quality CO2 data source.

Of the 12552498 new car registrations for ACEA in 2001, all but 285496 were known to be registered as petrol, diesel or other fuel driven cars. The 285496 cars, representing 2.3%[5] of the total, arose mainly due to the fact that ACEA's data on new passenger cars registrations in Greece were given without disaggregating petrol and diesel cars (see Annex)[15].

During 2001 the car manufacturers' associations have worked jointly with the Commission to develop future monitoring guidelines in a number of areas[16].Good progress could be made and a final set of criteria will most likely be adopted in 2002, see Annex.

2.11 Description of measurement issues for CO_2 Emission Factors

The ACEA Commitment specified that new car CO_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_2 emissions has been revised by Directive 99/100/EC. One of the principle changes (being 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_2 emissions.

Since January 2000, new homologations (new model introductions) of M1 vehicles up to 2500 kg have had their CO_2 emissions measured according to the "new" directive/cycle (99/100/EC). A correction factor needs to be applied to the

[13] This work is based on the "Exchange of Letters" which requires that "To ensure the monitoring system's effectiveness, joint agreements will be reached on the inclusion of: innovative concepts, cars using alternative fuels or propulsion systems; as well as on new and changed test procedures"

[14] Relevant wording of the "Exchange of Letters": "1. Statistical Monitoring on CO2: This part of the monitoring will be undertaken on the basis of the data to be provided under the Community monitoring scheme (COM(1998)348). It is noted, however, that ACEA is willing to provide the necessary data, e.g. broadly similar to those specified in Annex I of the draft monitoring decision, for this element of the monitoring, especially until this scheme is fully operational." At Steering Group level it has been agreed that the monitoring would be based on Member States' data from the monitoring period 2002 onwards.

[15] Please note: for previous years the statement is valid for Finland as well. Moreover, it should be noted that the diesel share in Greece is below 2%.

[16] This work is based on the "Exchange of Letters" which requires that "To ensure the monitoring system's effectiveness, joint agreements will be reached on the inclusion of: innovative concepts, cars using alternative fuels or propulsion systems; as well as on new and changed test procedures"

measured CO_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. However, ACEA's data provider (AAA) was not able to formulate a procedure for determining which newly registered cars in 2000 had their CO_2 emissions measured according to which (new or old) cycle. As a consequence, no correction factor was applied for 2000, and therefore the CO_2 data for 2000 in this report overstates ACEA emission data (i.e. ACEA emissions data should be lower). Estimates for the effect of the cycle change vary between 0.7 (Commission Estimate[17]) and 1.2% (ACEA[18]).

For the year 2001 ACEA considered it as essential to take the change of the test cycle into account. For this purpose ACEA explained that it assumes for 2001 that all but a maximum of 10% of registrations were based on Directive 99/100/EC. Therefore ACEA instructed AAA to reduce 2001 data collected for M1 vehicles up to 2500 kg by an average 1% "correction factor" to allow the data to be comparable to the test cycle EU 93/116/EC specified in the Commitment[19]. All 2001 CO_2 emissions have been lowered by ACEA by 1% for M1 vehicles up to 2500 kg. This difference in cycle-change "correction factor" application between 2000 and 2001 has meant that the reduction percentage in 2001 cannot be exactly specified - hence the reference to "about a 2.5% cut" in 2001 has been introduced by ACEA.

The Commission does not agree to this adjustment for two reasons:

- the correction factor should be 0.7%[20] and not 1.2%

- the fraction of passenger cars registered in the year 2001 in accordance with the new test cycle remains unclear[21]

The Commission believes that the CO2 emissions of ACEA's newly registered cars should be reduced by an agreed and appropriate correction factor (see Year 2000 Joint Report). As long as no agreement exists no correction should be applied.

2.12 Other Issues

Further, ACEA informed the Commission on 30.4.2002 that Rover is no longer a member of the associations. However, to maintain consistency with prior years - thereby allowing easy comparison with prior years when Rover was a member - all figures delivered by ACEA and contained in this report include Rover. According to ACEA the 2001 total figure would be about 0.1 g/km lower if Rover were excluded. The Commission will react to this change in membership in the course the year 2002, after having studied all consequences, including legal and competition aspects.

[17] The estimate corresponds to the results of a study carried out by TNO

[18] Based on manufacturers' assessment

[19] According to ACEA in order to take into account the registrations of new passenger cars in accordance with the old cycle, the correction factor applied was calculated as follows: 1.2% (ACEA correction factor for the change from the old cycle to the new cycle) times 0.9 (in order to take into account vehicles tested under the old cycle) is equal to about 1.0 %

[20] TNO (2000): "Correlation analysis between different test cycles, and options to take into account innovative vehicle concepts for the determination of the CO2 emissions" Final report to study contract XI/D3/ETU/990067.

[21] Article 8(2) of Directive 70/159/EEC provides a derogation for "end of series vehicles" (Member States may give a 12 months derogation to a manufacturer to allow the continued sale or registration of any type of vehicle up to 10 % of the previous years registration). The actual derogations given by Member States are not known. Therefore no sound correction can be made.

3. KEY ASSUMPTIONS TO THE COMMITMENT

3.1. Availability of Enabling Fuels

Statement on implication for the Commitment and justification

According to ACEA fuel quality has become an important CO2 Commitment issue[22]. The Commitment is based on ACEA's assumption of the "full market availability of fuels with sufficient quality to enable the application of technologies needed for the industry to achieve its CO2 commitments". In the Commitment's Technical Annex ACEA acknowledged the outcome of the conciliation procedure on Directive 98/70/EC, which set the sulphur level of gasoline and diesel fuels at 50 ppm, and upheld its 140 g CO2/km commitment by 2008[23]. ACEA was also aware of the emission standards laid down in the amended Directive 70/220/EC. Nevertheless ACEA has since made the point that despite substantial R&D, manufacturers and the catalyst suppliers have not succeeded in developing sulphur-tolerant after-treatment systems. The combustion of fuel containing sulphur poisons catalytic converters and in particular NOx reduction technology. The latter requires intermittent fuel enrichment to remove the poisoning, thus increasing fuel consumption and making fuel efficiency targets more difficult to meet. According to ACEA to achieve 140 g CO2/km and 2005 tailpipe standards simultaneously requires zero-sulphur fuels (below 10 ppm sulphur). Therefore ACEA welcomes the Commission's proposed changes to the Fuels Directive to ensure the availability of such fuels, and considers it as a necessary step in order to meet the 2008 target.

It should be noted that the current Fuels Directive discussions on a "Common Position" centre on the final date at which 100% of all fuel must be less than 10 ppm or "sulphur free". Both fuels must be introduced no later than 2005, and in a number of Member States measures are ongoing to do so even earlier. The mandatory date for 100% availability is 2009 for gasoline and diesel, subject to a review process for diesel fuel. ACEA mentions that this, together with the 2005 introduction date for "widespread availability of fuels" being left to the discretion of Member States introduces a high degree of uncertainty over the market availability of sulphur free fuels. According to ACEA this in turn could significantly restricts the ability for manufacturers to adequately plan the implementation of new technologies; consequently hampering the ability to achieve the ultimate target.

The Commission draws attention to the fact that the provision of 10 ppm fuels goes well beyond the expectation at the time of the signature of the Commitment.[24] Moreover it underlines that it has no doubt that these fuels would be available in sufficient quantities throughout the Community from 2005 onwards and no hampering of the introduction of new technologies is to be expected.

3.2. Distortion of Competition

Statement on implication for the Commitment and justification

ACEA states that it is disappointed that the European Community has hitherto failed to ensure that the EU's automobile industry is not put at a competitive disadvantage as a consequence of the differences of views on "Kyoto"[25]. ACEA

[22] It should be mentioned that the fuel quality does not create any problem for the figures shown in the report. The test fuels are sulphur-free since long allowing the manufacturers to take full advantage of their technology. However, the performance of cars would be less efficient under real world conditions, see COM(2001)241 final.

[23] The relevant text of the Commitment reads: "ACEA acknowledges the outcome of the conciliation procedure between the Council and the European Parliament on 29.6.1998 and upholds its 140 g CO2/km commitment by 2008. However, ACEA is expecting that fuels of the following better quality might be available in the market due to technical reasons, commercial competition as well as possible national policies :

A) Some gasoline (e.g. Super-Plus, 98 octane as agreed in Germany) and some diesel plus with a maximum sulphur content of 30 ppm are provided in 2000 on the whole EU market in a sufficient volume and geographical cover.

B) In 2005 full availability of fuels on the whole EU market which satisfy the following:
   - gasoline with a maximum sulphur content of 30 ppm and of a maximum aromatic content of 30%;
   - diesel with a maximum sulphur content of 30 ppm and a cetane number of minimum 58.

Any problems which might arise with respect to fuel quality will be considered in the monitoring procedure."

[24] See COM(2001)241 final.

[25] This statement is based on the assumption B of the Commitment which reads: "Distortion of competition. In order to ensure a level-playing field:…the Community will use its best efforts to continue to seek that other car manufacturing countries, notably Japan, USA and Korea, will undertake equivalent car CO2 reduction efforts, in line with the Kyoto Protocol spirit ensuring that the European automobile industry is not put at a competitive disadvantage in the world markets by CO2 reeducation commitments made in Europe":

draws attention to the fact that - in their view - EU manufacturers cannot pursue radically different product planning strategies to cater for different customer requirements in major world market, like the US compared to Europe. According to ACEA, to meet the ACEA Commitment certain other car characteristics are inevitably "compromised", making the European product less attractive to customers in markets less concerned with new car CO2 emissions (particularly vis-à-vis local competitors who seek to match domestic customer wants exactly). Also, ACEA states that where EU manufacturers introduce CO2 saving technology across-the-board, there has been found to be no opportunity to recover costs in markets less interested in CO2 reduction. Any adverse economic effects from lower competitiveness or margins will have adverse consequences for ACEA's ability to adhere to the Commitment in the future. ACEA is dissatisfied with the Commission's efforts to provide a level playing field. The Commission does not see any evidence that supports ACEA's point of view[26]. It draws attention to its efforts to convince, inter alia, Japan and the United States to sign the Kyoto Protocol. Moreover it draws attention to the Japanese Energy Efficiency Law, US CAFÉ rules (stricter targets presently under discussion), the recent voluntary declaration of US manufacturers to reduce the fuel consumption of special types of cars by 25 %,, and most recent steps considered in California towards a reduction of the fuel consumption of passenger cars. The Commission never promised that all manufacturers would compete in near future on a completely harmonised world market. In fact, 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.

3.3. Promotion of CO_2 efficient technologies

Statement on implication for the Commitment and justification

As indicated previously, ACEA members have high expectations for certain technologies, in particular those associated with direct injection engines. ACEA's Commitment was therefore based on the assumption of an unhampered diffusion of car CO_2 efficient technologies into the market. Consequently any measures which might hamper the diffusion process of CO_2 efficient technologies, must be taken into consideration in the monitoring procedure.

In the context of this assumption, ACEA signalled its concern, in prior reports, about anti-diesel policies in a number of Member States, including the UK (e.g. company car & running cost taxes) and Sweden (e.g. annual road tax is 3.82 times higher for diesel car than for petrol equivalent, limiting diesel sales to around 6% in year 2001).

In 2001, one ACEA member has presented the following to the UK Treasury:

- Diesel disincentives have been introduced in the UK.
- For ACEA, diesel share in the UK dropped from 22.6% in 1995 to a low of 15.8% in 1999 and 16.1% in 2000 (20% in 2001)
- For ACEA, diesel share in the UK is the lowest in the EU big five markets (2001 other market range: from 35.9% in Germany to 57.2% in France).
- For ACEA, CO2 reduction in the 1995-2000 period was -8.6% for EU, and -5.8% for UK (1995-2001: -11.4% and - 8.4% respectively).

With respect to the UK such policies include: the progressive removal of diesel's fuel duty advantage, and the subsequent imposition of a duty premium; a higher vehicle excise duty (VED) on diesels; fuel scale charges that disadvantage diesels; and a 3% uplift (for Stage III diesels) in company car taxation.
According to ACEA this clearly shows that anti-diesel policies damage the potential for CO2 reductions. ACEA urges the Commission to look into this case.

The Commission takes note of ACEA's arguments but believes that the consequences of national fiscal measures have to be studied taking a wider view, considering, inter alia, that Member States have all rights to exercise their prerogatives in the field of fiscal policy. Furthermore it draws attention to the fact that:

a) As stated in SEC (1998) 1047 "The negotiations with ACEA have clarified that ACEA does not intend to meet its CO_2 emission objective by a simple shift to diesel cars. Instead the European car industry is currently introducing a new generation of fuel-efficient direct-injection diesel engines which offer benefits to the consumer which are expected to lead to a short-term increase in the market share of diesel cars. These benefits, however, would be

[26] The exchange of letters clarifies in this respect: " The Commission will report on its efforts to ensure a level playing field for the European automotive industry. Should ACEA feel that its assumption concerning a distortion of competition is not borne out, it will provide the Commission with the analysis to corroborate this assessment".

offset in the medium term, during the lifetime of the agreement, by benefits accruing to the consumer due to fuel-efficient direct injection petrol engines which can be expected to reverse the market trend."[27] Thus it was anticipated from the beginning that a shift to diesel is not the only option to reduce CO_2 emissions.

b) Many Member States provide fiscal incentives for the purchase of fuel-efficient cars. These measures are currently diversified, and the Commission aims at approximating the regulation as a part of its work on Environmentally Enhanced Vehicles;

c) Although it is more expensive in most of the Member States to run a diesel car, depending on the annual mileage driven, there is no indication of a general "anti-diesel policy" in any of these Member States, with the exception of Greece. The significant diesel share increase in nearly all Member States since 1995 might be seen as an indication that in most of cases costs for purchasing and running diesel passenger cars are no obstacle for the current market success of this technology.

With regard to item a) ACEA draws attention to the fact that diesel vehicles have improved their efficiency by 13.1 % whereas gasoline vehicles have improved by 8.5 % since 1995 (see section 2.1). Therefore the introduction of new diesel technology contributed significantly more to the overall reductions achieved than the shift from gasoline vehicles to diesel vehicles. In order to guarantee that the positive overall CO2 reduction trend can be maintained the diesel share in Member States must be kept at a high level.

As laid down in the "Exchange of Letters" the Commission will consult the United Kingdom on this question.

3.4. Acceptance of innovation

Statement on implication for the Commitment and justification

Nothing further to report. (see Sections 1.2 & 2.8)

[27] See page 10 of SEC(1998)1047 of 19.06.1998

4. OTHER ISSUES

4.1. New Measures affecting CO_2

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

Nothing further to report. (see Sections 3.3, 4.2 & 4.3).

4.2. New regulatory measures

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

ACEA continues to anticipate that the End-of-Life Vehicle (ELV) Directive[28], which entered into force in 2000, will have adverse implications for the fuel efficiency of cars in the future[29].

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.

ACEA draws attention to the fact, that conclusions should not be drawn from vehicles which where newly registered at about 12 years before and which where treated in 2001. To ensure, that in the future vehicles are re-usable and/or recoverable to a minimum of 95% by weight the broad use of certain lightweight materials (for example compound materials) will be impossible, as they can hardly be recycled. Instead the ambitious recyclability targets will encourage the use of heavier but easy to recycle materials which will make it more difficult to reduce the overall weight of a car and hence its fuel efficiency.

Other Directives with major implications are the emissions Directive 70/220/EC and the fuel Directive 98/70/EC. According to ACEA 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 the European industry needs 100% availability of fuel with less than 10 ppm or "sulphur free", in order to meet both Stage IV emissions and the 140 g CO2 Commitment. The Commission draws attention to the fact that ACEA knew the EURO III and EURO IV limit values[30] at the time it signed the Commitment and that the introduction of 10 ppm fuel's goes beyond ACEA's expectation at that time. (see also Section 3.1)

ACEA is conducting a review of automotive regulations with introduction date after 1995. Estimates are being prepared of the effects on CO2 of these regulations either in terms of weight increases (see Section 1.3) or % fuel efficiency loss. Currently CO2 effects have been assessed for fourteen regulations, which include measures on tailpipe emissions, noise, safety, security, ELV, etc. According to ACEA, preliminary findings suggest that automotive regulations had adversely affected CO2 emissions by some 3% between 1995 and 2001.

The Commission does neither share the views of ACEA as regards a possible relation between the ELV Directive and CO2 emissions, nor does it share ACEA's views on the negative repercussions of regulations that were already known at the time of the signature of the Commitment.

4.3. Fiscal Measures

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

ACEA recognises the draft Commission Communication on "Taxation of Passenger Cars in the EU" and is supportive of the recommendation for registration tax to be reduced to a low level with a view to its total abolition. With regard to the proposal for CO2 differentiated taxes ACEA draws attention to the fact, that these taxes should not distort the

[28] Directive 2000/53/EC
[29] See Publication "Ökobilanzierung versus Recyclingquote" by S. Schäper, AUDI AG (31.10.2001)
[30] Directive 98/69/EC

market as this could contravene its Commitment, for example, they could jeopardise product diversity (by driving larger more powerful cars out of the market), or could damage financial performance.

The Commission draws attention to the fact that fiscal measures form the third pillar of the strategy, as outlined already in the 1995 Communication[31], and that the text of the ACEA Commitment clearly specifies that ACEA assumes that the Commitment provides complete and sufficient substitute for any additional fiscal measures in pursuit of the CO2 objectives of this Commitment. The fiscal measure considered do not aim at providing additional support to meet ACEA's target of 140 g/km in 2008, but aim at supporting the overall achievement of the Community target. As stated in the text of the Commitment under principles "Any fiscal measures, including their added value to this Commitment, will be taken into account in the monitoring procedure and their potential effects will be assessed in good faith".

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

Comment on impact of the issue and implications for the Commitment

As a support to develop technologies and measures for reduction of CO2 emissions from road vehicles the members of EUCAR set-up a R&D programme called CO2perate. This programme and its research activities have been described and reported in the earlier annual monitoring reports. In particular the 2000 report contains a fairly extensive overview of the CO2perate programme. The R&D activities regarding CO2 reduction during 2001 can be characterised as concentrating more on complementing and consolidating already started research projects, clusters and technology platforms than initiating completely new activities. The main reasons being that 2001 was the last year for calls to FP5, and the fact that the companies' resources for R&D are limited.

A number of new projects have however been initiated. These are mainly related to fuels, combustion and powertrain.

The need to view the powertrain from a more complete system perspective has been one reason for initiating studies on types and qualities of future, fossil based, fuels. During 2001 two proposals on fuel studies (gasoline and diesel respectively) were submitted and accepted under the Energy FP5 programme. The major aim of the gasoline project (called DIGAFA) is to use the coupling between direct injection gasoline engines and the fuel to optimise the combustion by designing the quality of the fuel. The diesel project (CLEAN) is focusing on improvement of emissions (especially particulates) by designing the diesel fuel to better match the engine concept.

Also basic research on the combustion process has been strengthened with a couple of new project. The first one, HY-SPACE, aims at an energy-efficient and ultra-low pollutants and noise emissions diesel engine concept, which is not depending on complex and fuel sensitive exhaust aftertreatment. The second one, LESSCO2, is to develop a 3D engine simulation design tool so that cycle by cycle variations in the spark-ignited internal combustion engine can be predicted and controlled. Thereby better efficiency and less pollutant can be expected.

A novel approach to the combustion process is to be explored in the project FPEC dealing with free-piston combustion to electric conversion. The idea is to directly convert the combustion piston movements into electric energy. Still many open questions to this approach exist, and it should be viewed as a medium term research.

The GET technology platform is now in operation. During 2001 it was complemented with the GET-Drive project which focuses on developing and providing suitable turbo chargers for the down-sized gasoline engine.

The diesel platform, EUDIESEL, is also up and running. A complementing project, D-CYCLE, aiming at emissions reduction by piezo electric high-pressured and modulated CR injection was accepted within the FP5 programme during 2001.

The third platform, SUVA, handling electric hybrids, is on its way according to plan.

[31] See COM(95)689 final

The EUCAR Fuel Cell research, collected under the cluster FUERO, is gradually moving towards a considerable programme with the addition of relevant technology projects. During 2001 the battery testing project ASTOR was linked into the cluster. Also the next step in progress was taken by submitting FUEVA, a programme for validation of fuel cell vehicle technologies. FUEVA has been accepted within the ENERGY FP5 programme.

Regarding the material research, in particular with the aim of light weight vehicles, no major new programmes or projects have been launched during 2001. Instead focus and resources were concentrated on earlier accepted projects (which are reported in the previous monitoring reports). However, the new project ALICE combining engine design and material should be mentioned. It aims to develop low weight graphite based components for the engine (i.e. piston, cylinder liner)

As indicated above, 2001 is a year of executing already initiated R&D projects rather than starting new activities. Furthermore, several of the projects initiated at the start of FP5 are now reaching their later stages and results should now start to be available. Initial discussions on how to assess these results and their potential impacts are being progressed by the CO2perate programme and PREMTECH, the Commission's cluster for powertrain. This is expected to be an activity stretching into year 2002 and 2003.

EUCAR has been deeply and broadly engaged in an effort to establish the energy and environmental aspects of road transport as a recognised part of the EU framework programmes for R&D. In particular during the later part of 2000 and the whole of 2001 plans for needed R&D and demonstrations were formulated and consolidated among the automotive industry. The initial proposal of the CEC for the coming FP6 programme did not contain many of these issues. However, the EU bodies had an open attitude and in the amended proposal of FP6 several of the industrial concerns on road transport research have been considered and included.

4.6. Other measures - telematics, infrastructure, education

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

ACEA manufacturers have continued to implement eco-driving programmes. ACEA believes that initiatives such as these, encourage customer acceptance of CO2 efficient technology and are one of the contributors to "market changes linked to (technological) developments" (as specified in the Commitment).

Further, the market penetration of navigation systems and other telematic and information services, which reduce road traffic CO2 emissions, has been increasing. Also, some manufacturers have started to promote the use of low friction engine oils and low friction tyres in servicing.

4.7. Economic situation of the car industry

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

ACEA reiterates its points made in prior reports. The economic situation of the European car industry, as reflected in its financial performance, competitiveness and employment situation, needs to be strong and healthy to provide the opportunity to focus resources on its CO_2 reduction Commitment. This is particularly the case, as ACEA now needs to accelerate its rate of CO2 reduction in the period to 2008 in order to meet the 140 g target (see Figure 3). Further, it must not be overlooked that ACEA car manufacturers operate in a complex environment, and have to manage finite resources to meet a range of competing societal and customer demands, not just CO_2 abatement.

The Commission has no evidence that the economic situation of the European car industry gives raise to any serious worries.

5. CONCLUSIONS

5.1. Progress Statement on Delivering the Commitment

In 2001, ACEA reduced the average CO2 emissions of its new car fleet registered within the EU to 164 g/km. This represents about a 2.5% cut from 2000, and a 1.9 % cut per year since 1995. Its recent CO2 performance has, in fact, exceeded ACEA's expectation. Technologies have been commercialised on a very large scale, and the enhanced fuel efficiency combined with other attractive product attributes has proved a particularly "interesting package". This was particularly the case for the new generation of technically-advanced, highly fuel-efficient and competitive direct-injection diesels.

Even so, to meet the target of 140 g/km in 2008 ACEA must - as anticipated - increase its annual average reduction rate to about 2.1% during the remaining period of the Commitment (see Figure 3).

Latest figures show that ACEA's CO_2 performance is consistent with the achievement of the 2003 estimated intermediate target range, 165 -170 g/km. And there is further strong evidence of ACEA's determination to meet the central CO2 targets -- for example ACEA's strong sales expansion of 140 g/km or less cars.

5.2. Statement on Expected Future Progress of the Commitment

Even though ACEA has, to date, been successful in reducing CO2 emissions, it must nevertheless increase its rate of annual CO2 emission reduction during the remaining period of the Commitment, and future product developments may not be as well received by the market, as introductions over the recent past. However, ACEA's objective is to achieve its Commitment, and ACEA will continue to focus significant research, product and process development towards attaining the 140 g CO_2/km target by 2008.

ACEA sees the main threats to its CO_2 reduction efforts as being:

1. The non-full market availability of fuels with a sufficient quality to enable the application of technologies needed for the industry to achieve its CO_2 Commitment.
2. New policy measures that impose "mutually exclusive" demands to CO_2 reduction (for example the ELV Directive).
3. The introduction of measures that hamper the diffusion of the CO_2 efficient technologies (e.g., fiscal measures).
4. Markets being distorted or the European industry's financial viability being undermined by factors not under industry's control (e.g., due to distortions on the world market)

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

Annexes

Monitoring rules established in accordance with the "Exchange of Letters"

1) Direct/indirect CO2 emissions: Indirect CO2 emissions caused due to primary energy and fuel production, as well as potential savings due to the use of biofuels etc, will not be taken into account within the monitoring; the commitments apply solely to the CO2 emissions of the vehicle.

2) Bi-fuel CNG and LPG passenger cars: From the two CO2 values associated with the usage of one or the other of the two fuels, the value of the fuel will be taken into account in the monitoring for which the fuel price at the pump, expressed in the caloric equivalent, is lower[32]. If necessary a differentiation among Member States will be made.

3) Electric and hydrogen vehicles with external hydrogen supply: These vehicles will be considered as zero-CO2-emission vehicles and counted towards the achievement of the target as long as the share of these vehicles is low[33]. In case the sales volume share becomes significant only a share of these vehicles will be counted towards the achievement of the target value (see assumption D of the Commitments). The need and, if necessary, the level of the threshold for the share of these vehicles will be discussed in the 2003 major review[34].

[32] It is expected, that customer will run the car on the alternative fuel, as long as total fuel costs, taking into account the fuel consumption and the necessary fuel volumes to operate the vehicle, remain lower than for the conventional fuels.
[33] This applies to bi-fuel hydrogen vehicles with a range of at least 150 km as well.
[34] ACEA explained that only a few thousand vehicles of these types are registered every year within the EU in total. Based on this number it was decided that these vehicles would be counted towards the achievement of the target until 2003 in any case.

ACEA
Data Annexes
2001

ACEA Data Annexes (2001)

A1 : SPECIFIC FUEL CONSUMPTION AND EMISSIONS OF CO_2 AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE, FOR THE EU AND EACH MEMBER STATE

A2 : THE DISTRIBUTION OF CO_2 EMISSIONS IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

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

A3a. The Distribution of New Passenger Cars: by Average Mass (kg)[35]

A3b. The Distribution of New Passenger Cars: by Average Engine Power (kW)

A3c. The Distribution of New Passenger Cars: by Average Engine Capacity (cm3)

A4: EU LIST OF M1 VEHICLES POTENTIALLY REGISTERED AS N1 (BY MODEL) IN EACH MEMBER STATE

[35] Curb weight of vehicles.

A1. SPECIFIC FUEL EFFICIENCY (L/100) 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

2001 – ACEA MEMBERS

Member State	Total	identified version										unknown version
		Petrol			Diesel			Petrol + Diesel			Other	
	Number	Number	average Fuel	average CO2	Number	average Fuel	average CO2	Number	average Fuel	average CO2	Number	Number
EU-15	**12,552,498**	**7,307,284**	**7.3**	**172**	**4,941,638**	**5.8**	**153**	**12,248,922**	**6.7**	**164**	**18,080**	**285,496**
A	247,898	75,803	7.1	169	171,654	5.7	152	247,457	6.1	157	10	431
B	432,309	143,240	7.1	169	288,895	5.7	151	432,135	6.2	157	48	126
DK	74,646	58,476	7.6	180	16,004	5.6	148	74,480	7.2	173	3	163
F	2,114,015	902,772	7.0	164	1,208,256	5.7	150	2,111,028	6.2	156	2,986	1
FIN	82,028	65,687	7.8	184	15,302	6.0	160	80,989	7.4	179	6	1,033
GER	2,963,088	1,808,014	7.6	181	1,063,605	6.0	159	2,871,619	7.0	173	468	91,001
GR	186,635											186,635
IRE	112,552	94,329	7.0	166	17,109	6.0	158	111,438	6.9	165	1	1,113
IT	2,110,599	1,277,363	6.5	154	819,334	5.7	151	2,096,697	6.2	153	12,927	975
LUX	38,570	15,182	7.8	186	23,361	5.9	155	38,543	6.6	167		27
NL	427,820	312,152	7.5	177	114,449	5.8	155	426,601	7.0	171	121	1,098
P	221,587	153,600	6.6	156	67,977	5.7	150	221,577	6.3	154	4	6
SP	1,287,068	573,367	7.2	169	712,196	5.6	148	1,285,563	6.3	157		1,505
SW	204,521	191,109	8.5	201	12,758	6.5	173	203,867	8.4	199	12	642
UK	2,049,162	1,636,190	7.5	178	410,738	5.9	158	2,046,928	7.2	174	1,494	740

A2 : THE DISTRIBUTION OF CO_2 EMISSIONS IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

ACEA MEMBERS: 2001

CO2 (category)	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	Number	Average CO2	Number	Average CO2	Number	average CO2
60 - 80	**0**	**0**	**8185**	**80**	**8185**	**80**
81 - 100	0	0	26049	89	26049	89
101 - 120	73616	116	198664	116	272280	116
121 - 140	928808	136	1579439	134	2508247	135
141 - 160	2404562	150	1827175	150	4231737	150
161 - 180	1633685	169	745957	170	2379642	169
181 - 200	1059188	189	250353	188	1309541	189
201 - 250	954561	221	254844	218	1209405	220
251 - 300	172699	272	40709	265	213408	270
301 - 350	66741	320	10263	309	77004	319
351 - 450	12288	389	0	0	12288	389
> 450	1136	475	0	0	1136	475

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

A3a. The Distribution of New Passenger Cars: by Average Mass (kg)[1]

ACEA MEMBERS: 2001

Member State	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	Average Mass	average CO2	Average Mass	average CO2	average mass	average CO2
EU-15	**1118**	**172**	**1318**	**153**	**1198**	**164**
A	1136	169	1365	152	1295	157
B	1096	169	1331	151	1253	157
DK	1196	180	1272	148	1212	173
F	1051	164	1260	150	1170	156
FIN	1225	184	1379	160	1254	179
GER	1209	181	1403	159	1279	173
IRE	1107	166	1388	158	1150	165
IT	973	154	1307	151	1104	153
LUX	1196	186	1367	155	1299	167
NL	1158	177	1341	155	1207	171
P	1015	156	1308	150	1105	154
SP	1106	169	1255	148	1188	157
SW	1336	201	1500	173	1346	199
UK	1142	178	1363	158	1186	174

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

A3b. The Distribution of New Passenger Cars: by Average Engine Power (kW)

ACEA MEMBERS: 2001

Member State	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	average Power	average CO2	average Power	average CO2	average Power	average CO2
EU-15	**74**	**172**	**77**	**153**	**75**	**164**
A	71	169	77	152	75	157
B	70	169	74	151	73	157
DK	81	180	73	148	80	173
F	68	164	72	150	71	156
FIN	85	184	77	160	84	179
GER	83	181	86	159	84	173
IRE	66	166	80	158	68	165
IT	58	154	77	151	65	153
LUX	93	186	84	155	87	167
NL	77	177	77	155	77	171
P	58	156	79	150	64	154
SP	71	169	68	148	70	157
SW	104	201	92	173	103	199
UK	78	178	78	158	78	174

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

A3c. The Distribution of New Passenger Cars: by Average Engine Capacity (cm3)

ACEA MEMBERS: 2001

Member State	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	average Cm3	average CO2	average Cm3	Average CO2	average Cm3	average CO2
EU-15	**1584**	**172**	**1959**	**153**	**1735**	**164**
A	1578	169	1966	152	1847	157
B	1534	169	1929	151	1798	157
DK	1714	180	1913	148	1757	173
F	1490	164	1930	150	1742	156
FIN	1775	184	2046	160	1826	179
GER	1721	181	2033	159	1836	173
IRE	1464	166	2002	158	1547	165
IT	1335	154	1933	151	1569	153
LUX	1842	186	2014	155	1946	167
NL	1651	177	1973	155	1737	171
P	1303	156	1917	150	1492	154
SP	1567	169	1916	148	1760	157
SW	1992	201	2116	173	2000	199
UK	1648	178	1989	158	1716	174

Monitoring of JAMA's commitment on CO_2 Emission Reduction from Passenger Cars (2001)

Final Report

28 June 2002

Joint Report
of the
Japan Automobile Manufacturers Association
and
the Commission Services

Monitoring of JAMA Commitment[36] on CO_2 Emission Reduction from Passenger Cars
JOINT REPORT OF JAMA AND THE COMMISSION SERVICES[37]: YEAR 2001 REPORT

ES SUMMARY OF PROGRESS IN DELIVERING THE AGREEMENT

E1 Trends in specific emissions of CO_2 (g/km)

In the EU, averaged specific CO_2 emissions of passenger cars sold by JAMA Members decreased from 2000 to 2001 – from 183 g/km in 2000 to 179 g/km in 2001[38]. This is a 2.2% drop[39].

For petrol-fuelled cars, specific emissions dropped from 177 g/km in 2000 to 175 g/km in 2001 – a 1.1% reduction. For diesel-fuelled cars, the corresponding values were 213 g/km in 2000 and 200 g/km in 2001 – a 6.1% reduction.

Over the full reporting period 1995 to 2001, specific emissions showed a decreasing trend. Specific CO_2 emission (g/km) levels of Japanese cars have tended to decrease by an average of 1.5% each year and fell from 196 g/km in 1995 to 179 g/km in 2001, achieving a 8.7% reduction compared to 1995 (see Figure 1).

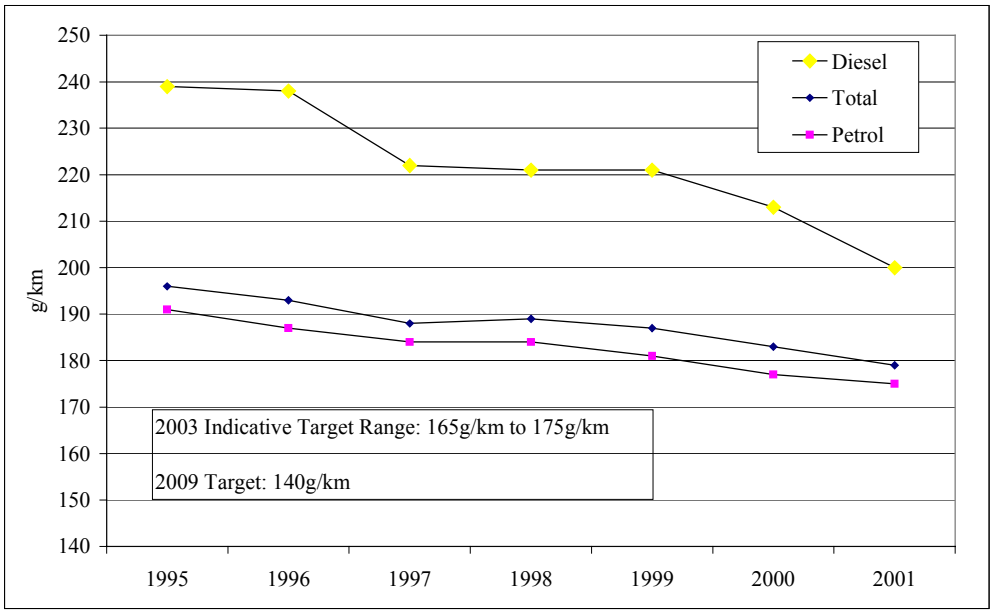


Figure 1. EU Trends of JAMA members' fleet in average specific emissions of CO_2

The average CO_2 emission levels of gasoline-fuelled cars recorded a decrease from 191 g/km in 1995 to 175 g/km in 2001 - a 8.4% reduction as compared with 1995. The average CO_2 emission levels of diesel cars recorded a decrease from 239 g/ km in 1995 to 200 g/km - a 16.3% reduction as compared with 1995.

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[36] As recognized by the European Commission in the Recommendation of 13 April 2000 on the reduction of CO2 emissions from passenger cars (2000/304/EC). Hereafter referred to as "The Commitment"

[37] Hereafter often referred to as "The Commission"

[38] From January 2000, new homologations (new model releases) of M1 vehicles up to 2500 kilos 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 JAMA's future targets were established and the basis of historical monitoring data in this report. No adjustment has been made to any JAMA numbers in this report for the change of test cycle. Had an adjustment been made, the emissions values noted for 2000 and 2001 would have been slightly lower (see Section 2.11).

[39] This value is a simple arithmetic average, and throughout the text simple arithmetic averages are used. All percentage figures are based on the rounded full specific emission numbers; for this purpose standard rounding rules are applied.

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

Fuel efficiency in 2001 was better than in 2000 for both petrol and diesel cars. Values in 2000 were 7.3 l/100km for petrol, 7.9 l/100km for diesel and 7.4 l/100km for all JAMA members' sales, while values in 2001 were 7.3 l/100km, 7.5 l/100km and 7.3 l/100km for petrol-fuelled cars, diesel-fuelled cars and all cars, respectively.

Gasoline passenger cars, which occupied most of JAMA's sales volumes over the full 1995 to 2001 reporting period, consumed about 8.0 l/100 km in 1995. Over the reporting period, their average fuel consumption has decreased to 7.3 l/100 km in 2001. Diesel cars consumed an average of 9.0 l/100 km in 1995, and achieved an average fuel consumption of 7.5 l/100 km in 2001(see Figure 2).

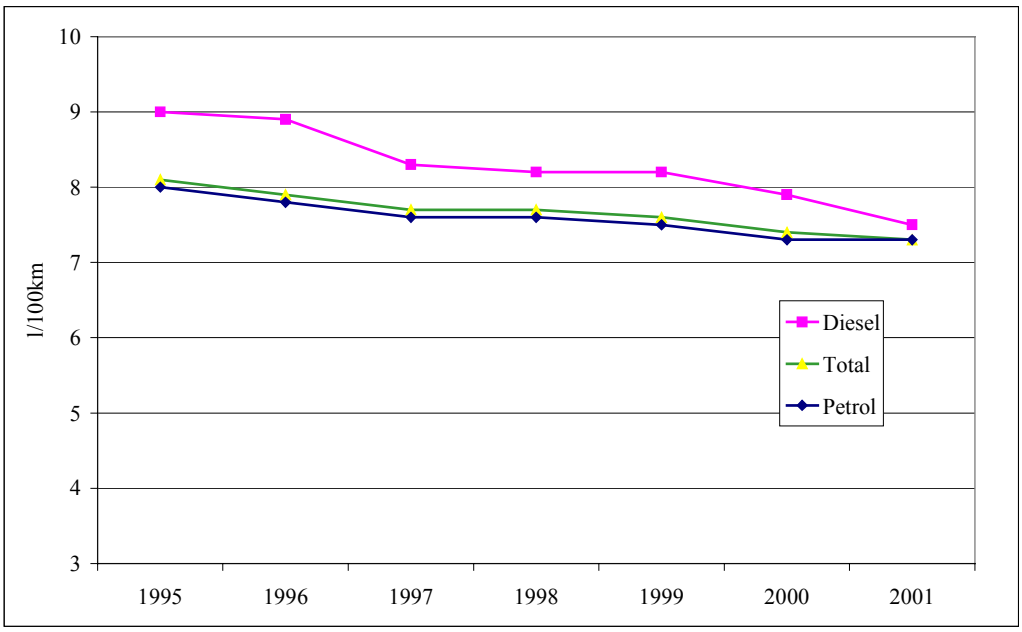


Figure 2. Trends of JAMA member's fleet in average specific fuel consumption by fuel (l/100km)

E3 Trends in physical fleet characteristics

The average mass of new petrol registrations slightly increased from 2000 to 2001 – from 1,133 kg in 2000 to 1,136 kg in 2001; for diesel the values decreased from 1,557 kg to 1,538 kg. When all sales are combined the average mass was 1,205 kg in 2000 and 1,207 kg in 2001. Average engine power of new registrations increased slightly, from 73 kW in 2000 to 76 kW in 2001. Average engine capacity also increased, from 1,650 cm^3 in 2000 to 1,668 cm^3 in 2001.

The general trends in physical characteristics over the whole reporting period 1995 to 2001 show an increase, notably in mass (+ 10.2%). This is mainly due to increasing gasoline car weight (+ 7.6%) and increased diesel car sales (+ 126%) over the reporting period. Average engine capacity increased by 2.9% over the period 1995 to 2001, and the engine power increased by 8.6% over the same period.

E4 Technical developments introduced to reduce CO_2 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 is continuing to be used on cars sold on the market. JAMA members have also introduced hybrid cars and idle stop mechanism in 2000.

E5	Brief overall assessment on progress in relation to the target

In the EU, averaged specific CO_2 emissions of passenger cars sold by JAMA members decreased from 2000 to 2001 – from 187 g/km in 2000 to 179 g/km in 2001. This is a 2.2% drop.

Over the whole reporting period, 1995 to 2001, JAMA members fleet's average specific CO_2 emissions fell from 196 g/km in 1995 to 179 g/km in 2001. Japanese automobile manufacturers have produced passenger cars achieving lower specific CO_2 emission levels since 1995, achieving a 8.7% decrease in average CO_2 specific emissions

The share of diesel cars in JAMA members' fleets has increased over the reporting period. While gasoline cars accounted for 89.6% of the fleet and diesel cars for 10.4% in 1995, diesel cars share increased to 18.1% in 2001, and gasoline cars share decreased accordingly to 81.9%.

An important achievement before the 2003 review is the launch on the EU market of gasoline cars emitting 120g/km in 1999. Although sales remain small (5,623 vehicles in 2001), this shows a positive effort made by JAMA.

Further CO2 emissions reductions are required to meet the indicative interim target (165 to 175 g/km in 2003) and the final target (140 g/km in 2009) g/km. If assuming that the achieved 2.2% reduction rate for 2000 to 2001 would be continuing hereafter, JAMA would meet the 2003 intermediate target. However, emissions reductions will have to fall faster (around 2.7%) 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.

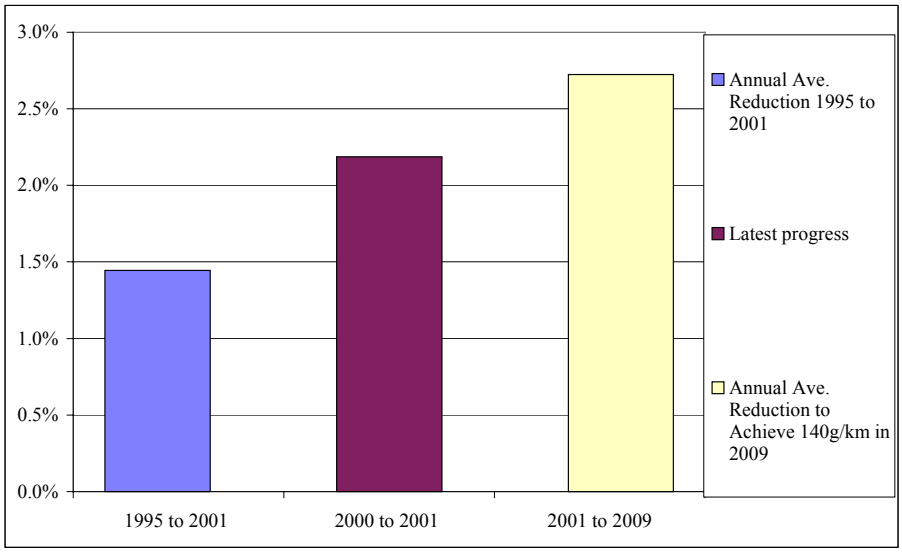


Figure 3 – The current and required annual rates of CO2 reduction

To achieve the CO_2 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.

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 AGREEMENT

1.1. Agreement Initiatives

1.1.1. 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 less than 120g/km) in the EU

JAMA has committed itself to achieving a 140 g/km emission target by 2009 and JAMA's members are continuing CO_2 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 CO_2 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 and it keeps certain market penetration by 2001 (approximately 3% of JAMA members' gasoline vehicle sales on the EU market in 2001). Similarly, a direct injection diesel car debuted on the market in 1998 and has seen a very quick uptake by the markets in 2001 (approximately 13% of JAMA members' diesel vehicles sales in 2001). Efforts are also made to diffuse the Continuous Variable Transmission Technology (CVT) available on the market prior to 1995. A Lean-Burn engine car has shown receding trend since 1997, and it's almost 0% in 2001.

Several low-emission passenger cars have been put on the EU market within the reporting period, achieving 120g/km. In 2000, a 80 g/km gasoline-hybrid car and another 119 g/km car with Idle stop mechanism have been put on the market by JAMA member companies. Another 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, mass increased by approximately 10.2% in 2001 as compared with 1995. The main factor is the increase in the weight of gasoline-fuelled cars (mass increased by around 7.6%). Engine capacity of Japanese cars showed a shift towards an increase by approximately 2.9% and their engine power presented an increase by approximately 8.6% in 2001 as compared with 1995. CO_2 emission levels, however, showed a decrease of approximately 8.7% for Japanese cars as a whole in 2001 as compared with 1995, a sign that the cars available on the market have benefited from CO_2 reduction technologies (see Section 2.4 for further details and linkage to CO_2). Trends in Member States are presented in the Annex.

2. STATISTICAL MONITORING (1995-2001)

2.1. Trends in specific emissions of CO_2 (g/km)

From 2000 to 2001 the average specific emissions from JAMA new car registration in the EU dropped by 2.2%[40] (from 183 to 179 g/km). For gasoline-fuelled cars the corresponding reduction was 1.1%, and for diesel fuelled cars, average specific emissions were 6.1% lower in 2001 than in 2000.

The average specific CO_2 emission levels of Japanese cars over the full 1995-2001 reporting period showed a decreasing trend (See Figure 4). Their average specific CO_2 emission levels tended to decrease by an average of roughly 1.5% each year and fell from 196 g/km in 1995 to 179 g/km in 2001 (marking a 8.7% reduction as compared with 1995).

The averaged specific CO_2 emission levels of gasoline-fuelled cars recorded a decrease from 191g/km in 1995 to 175g/km in 2001 - a 8.4% reduction as compared with 1995. This gives an average annual reduction of around 1.4 %.

The averaged specific CO_2 emission levels of diesel cars recorded a decrease from 239 g/km in 1995 to 200 g/km in 2001 - a 16.3% reduction as compared with 1995. This amounts to a 2.7% average reduction over the period.

Total average fuel consumption decreased within the reporting period 1995 to 2001: the diesel fuel consumption decreased from about 9.0 l/100 km to 7.5 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 7.3 l/100km. Corresponding figures for 2000 were 7.3 l/100km for petrol, 8.2 l/100km for diesel and 7.4 l/100km for the average of all JAMA registrations in that year.

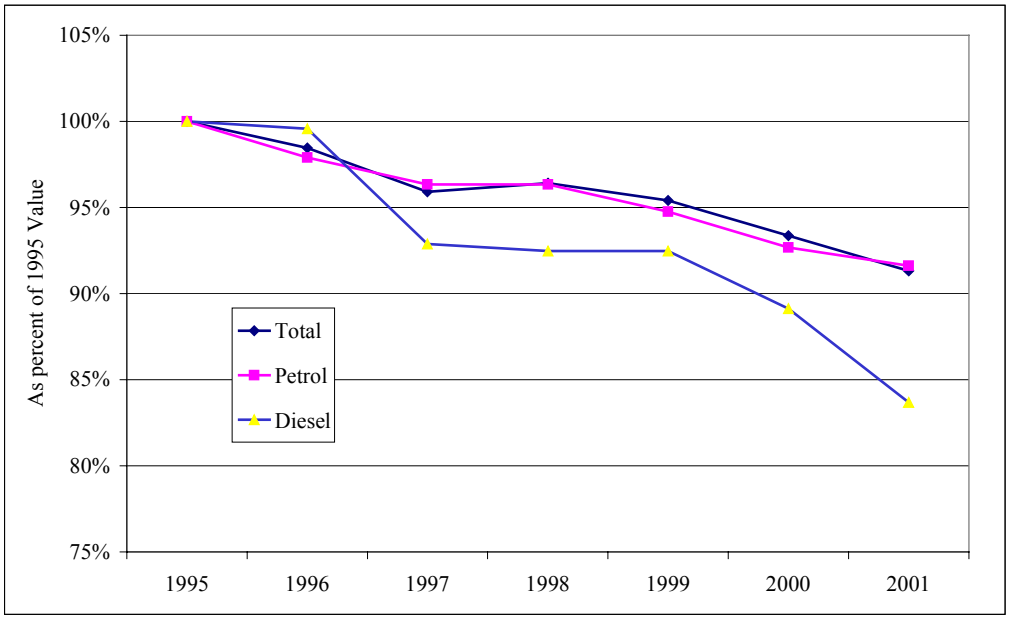


Figure 4: JAMA members' CO2 Reduction Index (1995=100)

2.2. Number of newly registered passenger cars

The number of gasoline passenger cars sold in the EU steadily increased from 1,013,138 vehicles in 1995 to 1,203,433 vehicles in 2001(+19%) and represents about 81.9% of total petrol and diesel car sales by JAMA members.

The number of diesel passenger cars sold increased from 117,577 in 1995 to 265,328 in 2001 (+126%), - showing the much bigger increment than gasoline cars (see Figure 5). Corresponding values for 2000 were: 1,347,425 petrol cars, 274,413 diesel cars, and 1,667,987[41] for all car registrations in 2000.

[40] ibid footnote 3

[41] For 2000, petrol and diesel cars together amount to 1,621,852 cars. "Unknown vehicles" make up the difference with the total vehicles (1,667,987). For 2001, petrol and diesel cars together amount to 1468795 cars; total vehicles were 1520643.

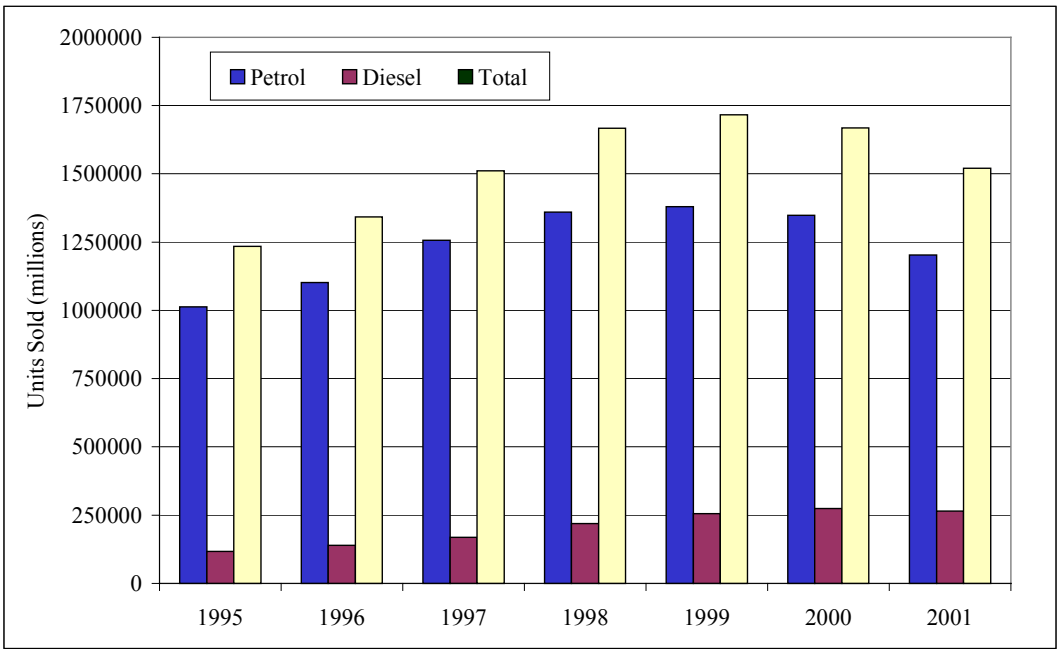


Figure 5. Number of newly registered passenger cars by JAMA members (unit registrations)

2.3. Fleet Composition

The share of cars emitting categories 121-140 g/km, 141-160g/km and 161-180 g/km has increased from 40.6% in 1995 to 61.9% in 2001, while the share of the car emitting more than 181 g/km decreased from 59.4% to 38.1%.

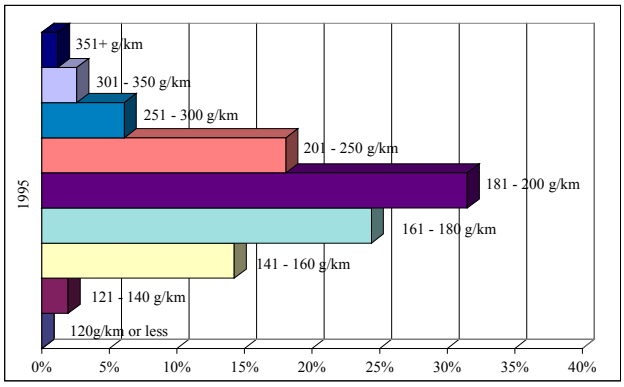


Figure 6a: JAMA's Fleet Composition per CO_2 Category in Shares of Total (petrol + diesel) in 1995

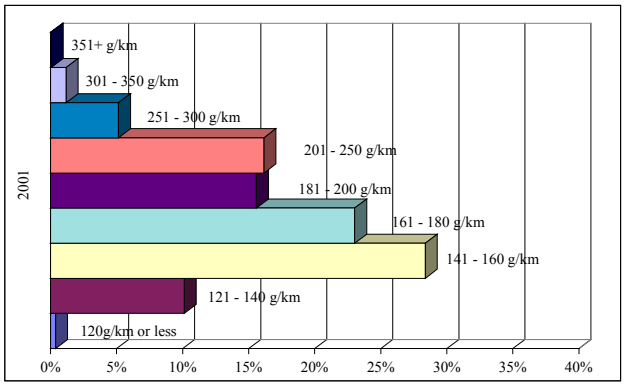


Figure 6b: JAMA's Fleet Composition per CO_2 Category in Shares of Total (petrol + diesel) in 2001

Furthermore, as Figures 6a and 6b show, an important shift in registrations for emissions categories over the period 1995 to 2001 was in the category of "121 to 140 g/km"; there were 148,576 new registrations for this category in 2001, up from 22,055 in 1995. Figure 6c shows the rapid growth in the 140g/km or less and 141g/km to 160g/km ranges over the reporting period. Over the same period, there was a particularly market drop in the registration of vehicles in the 181g/km to 200g/km range, as well as reductions in shares in all higher emissions ranges.

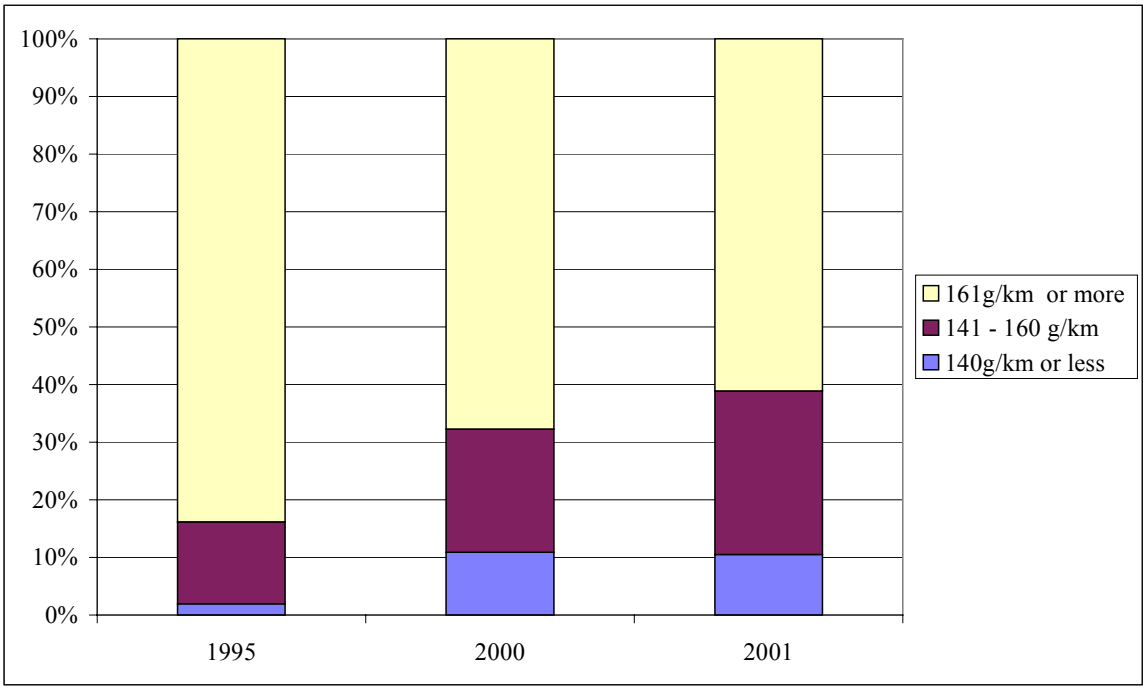
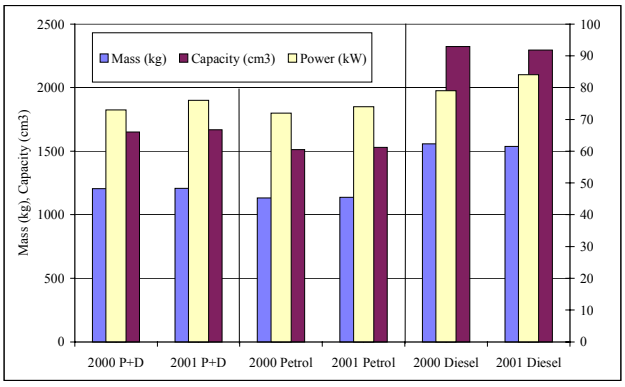


Figure 6c Change in JAMA's Fleet Composition between 1995, 2000 and 2001 by "aggregated CO_2 Categories":

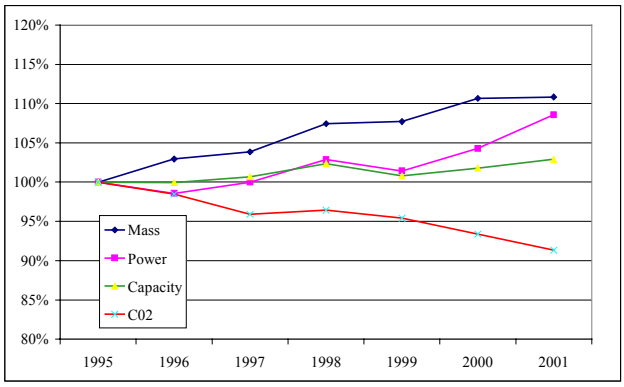
2.4. EU trends in physical fleet characteristics

Changes in physical characteristics - mass, engine capacity and engine power - from 2000 to 2001 showed an upward trend, continuing the overall trend present over the full reporting period 1995 to 2001. (see Figure 7a and 7b). The average mass of new registrations slightly rose from 1,205 kg in 2000 to 1,207 kg in 2001; engine capacity increased from 1,650 cm^3 to 1,668 cm^3; and power rose from 73 kW to 76 kW in 2001. Average diesel-fuelled car mass was over a third higher than that for petrol, and the capacity was just over 50% higher for diesel-fuelled cars than for petrol cars.

Average total automobile mass was 1,095 kg in 1995 and increased by 10.2% over the reporting period (1,207 kg in 2001). Gasoline automobiles' average mass has increased by 7.6% within the reporting period, from 1,056 kg in 1995 to 1,136 kg in 2001. Diesel automobiles' average mass reached the minimum of 1,447 kg in 1997 (against 1,461 kg in 1995) but increased up to 1,538 kg in 2001; i.e. a 5.3% increase over the reporting period 1995 to 2001.



Figures 7a: Physical JAMA members' fleet characteristics for 2000 & 2001



Figures 7b: Physical JAMA members' fleet characteristics 1995 to 2001 (percent of 1995 values)

Total engine capacity has increased by 2.9% within the reporting period, from 1,621 cm^3 in 1995 to 1,668 cm^3 in 2001. Gasoline engine capacity reached the maximum 1,558 cm^3 capacity in 1998 (against 1,543 cm^3 in 1995) and decreased to 1,530 cm^3 in 2001 (-0.8% as compared with 1995). Diesel engine capacity reached a minimum 2,285 cm^3 capacity in

1997 (against 2,298 cm^3 in 1995) but remained constant over the reporting period (2,296 cm^3 in 2001). The overall trend shows only a marginal growth in average engine capacity over the reporting period.

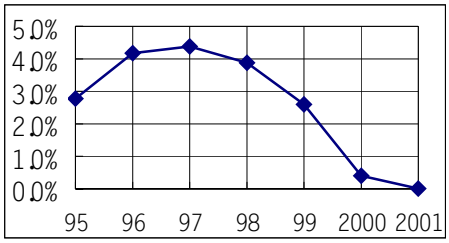
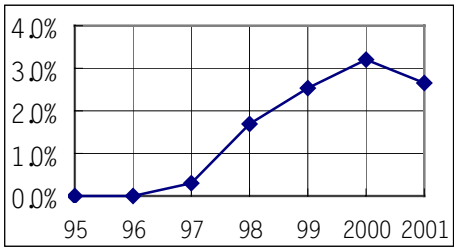
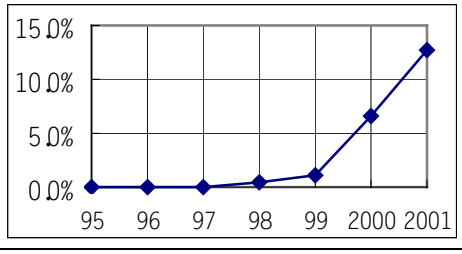
While total engine power was 70 kW in 1995, it has risen to 76 kW by 2001, a 8.6% increase in EU average over this five year period. Gasoline engine power has increased from 70 kW in 1995 to 74 kW in 2001. Diesel engine power has steadily increased by 27.3%within the reporting period, i.e. from 66 kW in 1995 to 84 kW in 2001.

While the physical characteristics increased over the period, average specific CO_2 emissions dropped by 8.7% over the reporting period (see Figure 6b).

2.5. Trends in new technologies

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, shares of JAMA total new sales remain small excluding rapid increasing diesel direct injection. The shares of cars equipped with gasoline & diesel direct injection engines have increased from 0% to 2.7% and 12.7% (respectively) since their respective launch in 1997 and 1998. Sales of cars equipped with Continuous Variable Transmission Technology (CVT) have shown 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 below:

	Qualitative Description	Quantitative (Optional)
Lean burn	Marketed in 1992. Has shown a receding trend since 1997, and it's almost 0% in 2001. (shift to DI gasoline)	
Direct Injection Gasoline	Since it was first marketed in 1997 it has shown definite growth.	
Direct Injection Diesel	Has been marketed in 1998. Showed rapid growth in 2001.	

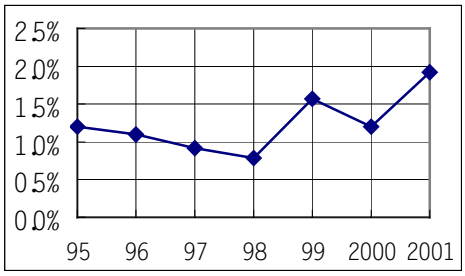
CVT	Marketed in 1988. No particular trend between 1995 and 2001.	

Figure 8: Trends in New Technologies launched by JAMA members on the EU market

2.6 Trends in low emission passenger cars

JAMA released its first "120g/km or less" car on the EU market in 1999. In 2000, JAMA has launched a 119g/km car and a 80g/km gasoline-hybrid car. Furthermore, JAMA released a 120g/km gasoline-hybrid model in the autumn of 2000 (see Section 1.2.4).

In 2000, 8,555 JAMA cars with emissions of 120g/km or less were registered in the EU, up from 5,544 cars in 1999 (a 54% increase); in earlier years there had been no sales of vehicles in this emissions category.

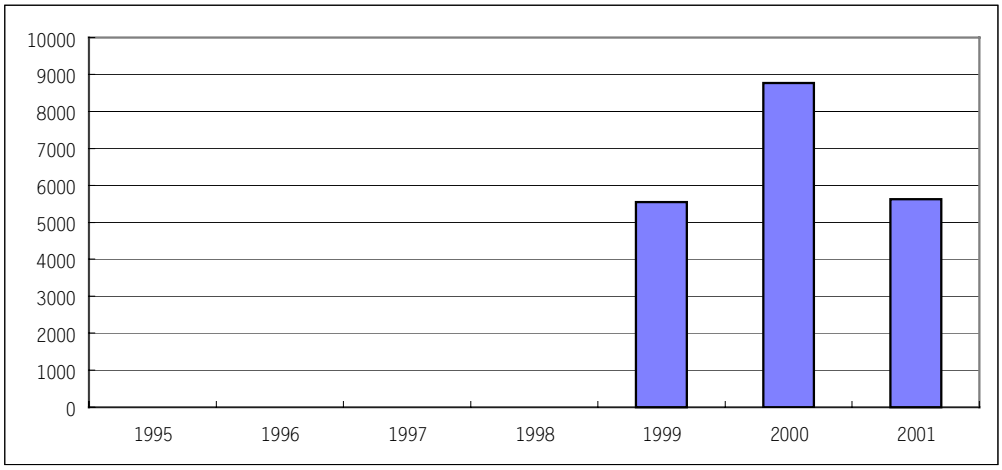


Figure 9 : JAMA members Sales of Vehicle with Specific Emission of 120g/km or less(unit sales)

The registered number of low emission passenger cars is fluctuating since the market has not grown yet in EU.

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

Nothing to report.

2.9 Brief Description of the degree of occurrence of Grey Areas between M1 and N1 vehicles

JAMA estimates the number of M1 vehicles potentially registered as N1 in the EU amount to a total of 70,449 vehicles or 4.6% of total registrations in 2001.

2.10 Data methods (Monitoring Decision annexes II & III), data sources, and data confidence levels

As in the previous report JAMA has used CO_2 statistics supplied by Marketing Systems Corporation. As agreed with the Commission, JAMA continues to provide CO2 data into the monitoring process as long as the official EU scheme (1753/2000/EC) has not reached the stage where Member State provided data can become the basis for monitoring progress[42].

Of the 1,520,643 new car registrations for JAMA in 2001, only 51,871 units did not have specific CO2 emissions values, and hence excluded from the average specific CO2 emissions. The 51,871 vehicles, represents just under 3.4% of total new registrations.

2.11 Description of measurement issues for CO_2 Emission Factors

JAMA's CO_2 emissions figures have been established according to Directive 93/116/EC, which replaced the old Directive 80/1268/EC. The new test cycle has been fully implemented as from 1.1.1997, and will be applicable for the coming years. Among other changes, the new cycle includes for the first time a cold start period, and consequently values for fuel consumption and CO_2 emissions are higher under the new system. The implementation of this new measuring procedure has led to an artificial average increase of 9% of the CO_2 emission figures, compared to the previously used Directive, whereas the CO_2 emissions from cars in the real world have not changed.

One of the principle changes (being introduced during years 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. Such a change of test procedure increases the measured value of CO2 emissions for any given vehicle design.

From January 2000, new homologations (new model releases) of M1 vehicles up to 2500 kilos 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 JAMA's future targets were established and the basis of historical monitoring data in this report. However JAMA's data provider (Marketing Systems) has not been able to formulate a procedure for determining which newly registered cars in 2000 and 2001 had their CO2 emissions measured according to which (new or old) cycle. As a consequence, no correction factor has been applied, and therefore the CO_2 data for 2001 in this report overstates JAMA emission data. Estimates for the effect of the cycle change vary between 0.7 (Commission Estimate[43]) and 1.2% (ACEA[44]).

JAMA's data on 2001 registrations is not corrected by an average of 1% by JAMA's data provider. JAMA considers that the impact of this measurement cycle change needs to be further assessed in the future.

2.12 Other Issues

Nothing to report.

[42] However, it has been agreed between JAMA an,d the Commission that Member States' data will be used from the year 2002. According to Decision 1753/2000/EC Member States' data have to be used for the year 2003 at the latest.
[43] The estimate corresponds to the results of a study carried out by TNO: TNO (2000): "Correlation analysis between different test cycles, and options to take into account innovative vehicle concepts for the determination of the CO2 emissions" Final report to study contract XI/D3/ETU/990067.
[44] Based on ACEA's assessment

3. KEY ASSUMPTIONS TO THE AGREEMENT

3.1. Availability of Enabling Fuels

Statement on implication for the Commitment and justification

JAMA indicates that the premise on which the achievement of the CO_2 emission targets rests is not only the development of technology necessary for improving fuel efficiency but also for upgrading the quality of the fuel products that make this possible. The full availability of fuels with a sufficient quality to enable the application of technologies is imperative for the industry to achieve its CO2 commitment. JAMA states that the direct injection gasoline engine will not become an effective technology without exhaust gas treatment technologies such as NOx catalyst. According to JAMA the same can be said for the diesel engine and it will not be effective until Diesel Particulate Filter (DPF) and NOx catalyst are fitted.

The Commission draws attention to its proposal COM(2001)241 final. The current Fuels Directive discussions on a "Common Position" centre on the final date at which 100% of all fuel must be less than 10 ppm or "sulphur free". Both fuels must be introduced no later than 2005, and in a number of Member States measures are ongoing to do so even earlier. The mandatory date for 100% availability is 2009 for gasoline and diesel, subject to a review process for diesel fuel. In the light of these facts the Commission underlines that it has no doubt that these fuels would be available in sufficient quantities throughout the Community from 2005 onwards and no hampering of the introduction of new technologies is to be expected. The Commission draws attention to the fact that the provision of 10 ppm fuels goes well beyond the expectation at the time of the signature of the Commitment.

3.2. Distortion of Competition

Statement on implication for the Commitment and justification

Nothing to report.

3.3. Promotion of CO_2 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 CO_2

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 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

4.6.1. 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 Agreement

Japanese automobile manufacturing companies will concentrate on CO_2 emission reductions by developing low-emission cars. Although Japanese companies have begun to put more CO_2 efficient gasoline cars (emitting 119 g/km) on the EU market in 1999 and have launched a 80 g/km gasoline-hybrid car on the market in 2000, there was no sign of significant CO_2 emissions reductions due to these factors during the period 1995 to 2001 due to low sales volumes.

5.2. Statement on Expected Future Progress of the Agreement

The estimated target range of 165-175 g/km in 2003 and the final target value of 140 g/km in 2009 require further serious effort by the Japanese automobile manufacturers. If JAMA succeeds in the next few years to reduce average specific emissions at the same rates as for 2000 to 2001 (a 2.2% reduction, from 183 to 179 g/km[45]), JAMA would meet in 2003 the upper limit of the set target (175 g/km). However, emissions reductions will have to fall faster for the lower 2003 target (165 g/km) and the 2009 target (140 g/km) to be met. For the 2009 target, annual emissions reductions will have to increase to an average of 2.7% per year [46]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 CO_2 efficient technologies. Japanese automobile manufacturers have agreed to make every endeavour 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 a sufficient quality 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 CO_2 emission reduction technologies in consideration of a balanced approach with regard to other regulatory requirements.

The Commission Services and JAMA has presently no reason to believe that the targets will not be reached.

[45] The drop from 183 to 179g/km gives a reduction of 2.2%; differences due to rounding in the specific emissions figures

[46] Simple arithmetic average; compound average rate would be around 3% per annum

Annexes

Monitoring rules established in accordance with the "Exchange of Letters"

4) Direct/indirect CO2 emissions: Indirect CO2 emissions caused due to primary energy and fuel production, as well as potential savings due to the use of biofuels etc, will not be taken into account within the monitoring; the commitments apply solely to the CO2 emissions of the vehicle.

5) Bi-fuel CNG and LPG passenger cars: From the two CO2 values associated with the usage of one or the other of the two fuels, the value of the fuel will be taken into account in the monitoring for which the fuel price at the pump, expressed in the caloric equivalent, is lower[47]. If necessary a differentiation among Member States will be made.

6) Electric and hydrogen vehicles with external hydrogen supply: These vehicles will be considered as zero-CO2-emission vehicles and counted towards the achievement of the target as long as the share of these vehicles is low[48]. In case the sales volume share becomes significant only a share of these vehicles will be counted towards the achievement of the target value (see assumption D of the Commitments). The need and, if necessary, the level of the threshold for the share of these vehicles will be discussed in the 2003 major review[49].

[47] It is expected, that customer will run the car on the alternative fuel, as long as total fuel costs, taking into account the fuel consumption and the necessary fuel volumes to operate the vehicle, remain lower than for the conventional fuels.
[48] This applies to bi-fuel hydrogen vehicles with a range of at least 150 km as well.
[49] ACEA explained that only a few thousand vehicles of these types are registered every year within the EU in total. Based on this number it was decided that these vehicles would be counted towards the achievement of the target until 2003 in any case.

JAMA
Data Annexes
2001

DATA ANNEXES (2001)

A1: SPECIFIC FUEL EFFICIENCY (L/100km) AND EMISSIONS OF CO_2 (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 CO_2 EMISSIONS (g/km) IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

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

A3a. The Distribution of New Passenger Cars: by Average Mass (kg)

A3b. The Distribution of New Passenger Cars: by Average Engine Power (kW)

A3c. The Distribution of New Passenger Cars: by Average Engine Capacity (cm3)

A4: EU LIST OF M1 VEHICLES POTENTIALLY REGISTERED AS N1 (BY MODEL) IN EACH MEMBER STATE

A1 : SPECIFIC FUEL CONSUMPTION AND EMISSIONS OF CO_2 AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE, FOR THE EU AND EACH MEMBER STATE

2001 - JAMA MEMBERS

2001	Petrol			Diesel			Other	All			CO2	Total
	Number	Fuel Efficiency	CO2	Number	Fuel Efficiency	CO2	Number	Number	Fuel Efficiency	CO2	Unknown	Number
EU-15	1,203,433	7.3	175	265,328	7.5	200	4	1,468,765	7.3	179	51,871	1520643
A	21,544	7.4	177	18,327	7.0	190	0	39,871	7.2	183	204	40075
B	32,707	7.3	175	14,578	7.1	191	4	47,289	7.2	180	1,987	49279
DK	18,529	7.3	174	4,553	7.6	205	0	23,082	7.3	180	1,179	24261
F	67,811	7.1	170	49,073	7.8	208	0	116,884	7.4	186	2,535	119423
FIN	23,775	7.2	173	1,662	6.8	180	0	25,437	7.2	173	306	25743
GER	278,431	7.6	181	46,073	7.3	195	0	324,504	7.5	183	1,130	325634
GR	49,548	7.0	167	1,307	7.1	189	0	50,855	7.0	167	1,721	52576
IRE	39,947	7.0	166	7,254	8.8	239	0	47,201	7.2	177	2,852	50053
IT	165,829	6.8	163	42,261	7.6	203	0	208,090	6.9	171	3,494	211584
LUX	1,957	7.8	187	1,169	7.4	198	0	3,126	7.7	191	252	3378
NL	72,400	7.2	173	6,237	6.7	179	0	78,637	7.2	174	1,216	79853
P	22,648	6.6	159	5,387	6.9	186	0	28,035	6.7	164	1,342	29377
SP	57,909	7.4	178	44,929	6.9	183	0	102,838	7.2	180	28,034	130872
SW	29,619	7.9	188	665	9.7	259	0	30,284	7.9	189	3,768	34052
UK	320,779	7.4	178	21,853	8.5	228	0	342,632	7.5	182	1,851	344483

A2 : THE DISTRIBUTION OF CO_2 EMISSIONS IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

2001 – JAMA MEMBERS

CO2			<60	60-80	81-100	101-120	121-140	141-160	161-180	181-200	201-250	251-300	301-350	351-450	450<	Total
2001	Petrol	Number	0	107	0	5225	145737	345441	266721	198656	215100	15194	10632	620	0	1203433
		CO2	0	80	0	119	136	152	170	189	218	271	311	398	0	175
	Diesel	Number	0	0	0	291	2839	71319	71533	30238	22197	60238	6673	0	0	265328
		CO2	0	0	0	113	135	154	170	189	231	273	328	0	0	200
	Other	Number	0	0	0	0	0	0	0	0	4	0	0	0	0	4
		CO2	0	0	0	0	0	0	0	0	225	0	0	0	0	225
	All	Number	0	107	0	5516	148576	416760	338254	228894	237301	75432	17305	620	0	1468765
		CO2	0	80	0	119	136	152	170	189	219	273	318	398	0	179

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

A3a. The Distribution of New Passenger Cars: by Average Mass (kg)[1]

2001 – JAMA MEMBERS

2001	Petrol		Diesel		All	
	Mass	CO2	Mass	CO2	Mass	CO2
EU-15	1,136	175	1,538	198	1,207	179
A	1,141	177	1,488	190	1,300	183
B	1,112	175	1,357	191	1,187	180
DK	1,111	174	1,535	203	1,194	179
F	1,057	170	1,574	208	1,274	186
FIN	1,222	173	1,475	180	1,239	173
GER	1,200	181	1,595	195	1,256	183
GR	1,107	167	1,517	189	1,117	167
IRE	1,114	166	1,622	228	1,177	174
IT	1,038	162	1,596	203	1,152	171
LUX	1,222	187	1,589	198	1,359	191
NL	1,062	173	1,355	172	1,084	173
P	1,070	159	1,432	186	1,140	164
SP	1,154	178	1,391	178	1,253	178
SW	1,312	188	1,898	259	1,325	189
UK	1,153	178	1,716	227	1,188	181

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

A3b. The Distribution of New Passenger Cars: by Average Engine Power (kW)

2001 – JAMA MEMBERS

2001	Petrol		Diesel		All	
	Power	CO2	Power	CO2	Power	CO2
EU-15	74	175	84	199	76	179
A	72	177	82	190	77	183
B	74	175	69	191	72	180
DK	78	174	78	205	78	180
F	72	170	88	208	79	186
FIN	78	173	82	180	78	173
GER	77	181	88	195	79	183
GR	68	167	81	189	68	167
IRE	66	166	87	239	69	177
IT	64	163	86	203	69	171
LUX	88	187	85	198	87	191
NL	72	173	80	179	73	173
P	64	159	76	186	67	164
SP	76	178	76	181	76	180
SW	87	188	92	259	88	189
UK	78	178	91	228	79	182

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

A3c. The Distribution of New Passenger Cars: by Average Engine Capacity (cm3)

2001 – JAMA MEMBERS

2001	Petrol		Diesel		All	
	Capacity	CO2	Capacity	CO2	Capacity	CO2
EU-15	1530	175	2296	200	1668	179
A	1530	177	2193	190	1835	183
B	1534	175	2075	191	1701	180
DK	1591	174	2176	205	1707	180
F	1453	170	2364	208	1836	186
FIN	1589	173	2171	180	1627	173
GER	1618	181	2314	195	1717	183
GR	1424	167	2151	189	1442	167
IRE	1412	166	2532	239	1584	177
IT	1327	163	2331	203	1531	171
LUX	1739	187	2313	198	1954	191
NL	1532	173	2146	179	1581	173
P	1335	159	2111	186	1484	164
SP	1560	178	2190	183	1835	180
SW	1796	188	2633	259	1815	189
UK	1579	178	2525	228	1639	182

Monitoring of KAMA's Commitment on CO_2 Emission Reduction from Passenger Cars (2001)

Final Report
27 June 2002

of the
Korea Automobile Manufacturers Association
and
the Commission Services

ES SUMMARY OF PROGRESS IN DELIVERING THE COMMITMENT

E1 Trends in specific emissions of CO_2 (g/km)

KAMA reduced the average CO_2 emission of its new passengers car fleet registered (petrol and diesel) in the EU market to 186 g/km in 2001,[52] from 191 g/km in 2000[53] and 197 g/km in 1995. This represents a reduction of 5.6 % over the whole monitoring period of 1995-2001 (average 0.9%[54] per annum) and 2.6%[55] over the period 2000 to 2001. The 2.6 % reduction in the average specific emissions is the highest rate over the whole reporting period.

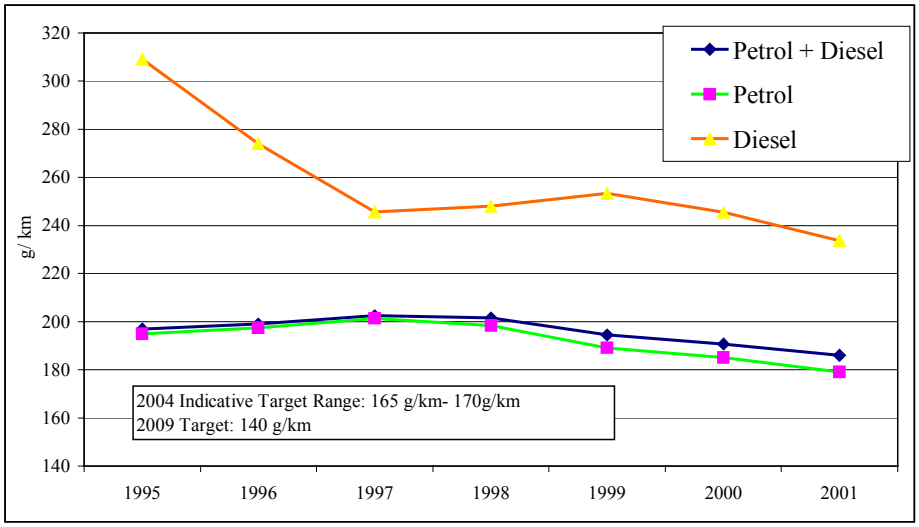


Figure 1: EU Trends of KAMA's Fleet in Specific Average Emissions of CO_2

Average specific CO_2 emission from gasoline-fuelled cars fell from 195 g/km in 1995 to 179 g/km in 2001 (an 8.2 % drop) and from 185g/km in 2000 (a 3.2 % drop). Average specific CO_2 emissions from diesel-fuelled cars fell from 309 g/km in 1995 to 234 g/km in 2001 - a significant 24.3 % drop - and from 245 g/km in 2000 - a 4.6 % reduction (see Figure 1).

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

Specific fuel consumption (litres/100 km) of gasoline engine and diesel engine is proportional to their CO_2 emissions - the lower the fuel consumption, the lower the emissions.

[50] As recognized by the European Commission in the Recommendation of 13 April 2000 on the reduction of CO_2 emissions from passenger cars (2000/303/EC). Hereafter referred to as "The Commitment".
[51] Hereafter often referred to as "The Commission"
[52] All 2001 CO2 performance figures have been lowered by 1% for M1 vehicles up to 2500 kg identified to have been tested under the new test cycle by KAMA for the estimated effects of the mandatory drive cycle change, progressively introduced from January 2000, as to bring them in line with the amended Directive 93/116/EC on which the Commitment is based (see Section 2.11). The Commission considers a correction factor of 0.7% as justified.
[53] All year 2000 figures (as well as figures shown for previous years) shown in this report are unadjusted for the recent test cycle change.
[54] This value is a simple arithmetic average, and throughout the text simple arithmetic averages are used. All percentage figures are based on the rounded full specific emission numbers; for this purpose standard rounding rules are applied.
[55] The reduction percentage in between the years 2000 and 2001 cannot be exactly specified as Year 2001 figures have been fully adjusted for the adverse effects of the cycle change (see footnote 3), but Year 2000 data has not.

Total fuel consumption for gasoline and diesel fuelled cars combined decreased from 8.2 l/100 km in 1995 to 7.6 l/100 km in 2000 and to 7.5 l/100 km in 2001.

Gasoline 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 7.4 l/100 km in 2000 and to 7.3 l/100 km in 2001. Diesel cars consumed an average of 11.6 l/100 km in 1995, decreasing to 9.2 l/100 km in 2000 and 8.8 l/100 km in 2001 (see Figure 2).

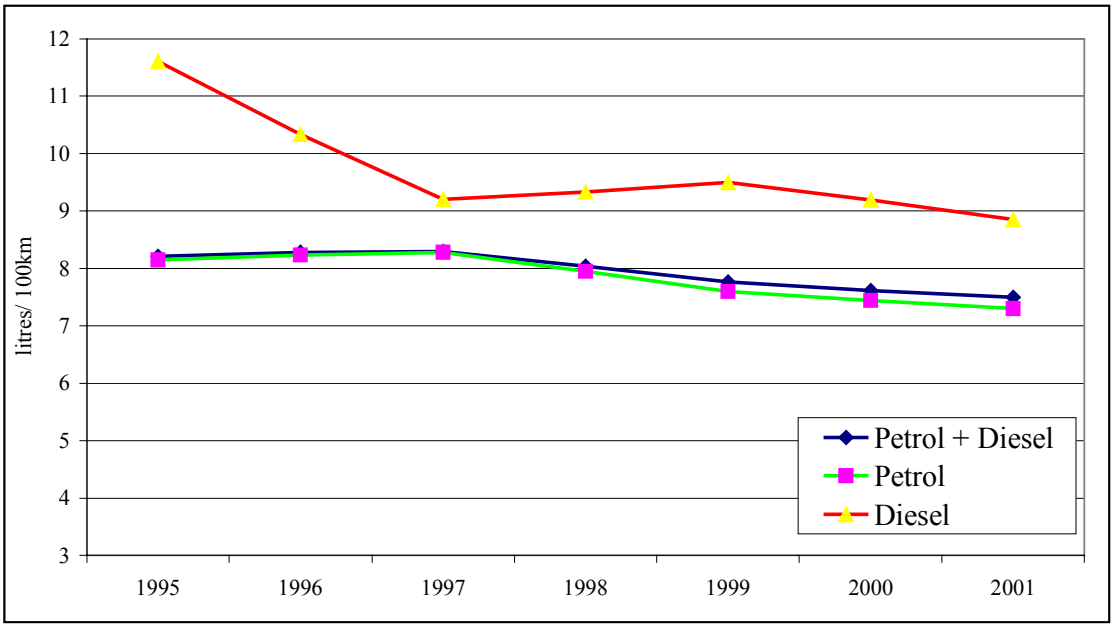


Figure 2: Trends in KAMA's Fleet in Specific Average Fuel Consumption, by Fuel Type

E3 Trends in physical fleet characteristics

The average power for newly registered cars have increased by 6.6 % between 2000 and 2001, and the average mass has increased – from 1,075 kg in 2000 to 1,141 kg in 2001 (a 6.1 % increase). 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 increase from 61 kW in 2000 to 65 kW in 2001. The increment in the mass of gasoline cars was the reason for the increase in the overall mass of new gasoline and diesel car registrations. Indeed while the mass of gasoline cars increased from 1,006 kg to 1,038 kg (2000 to 2001), the mass of diesel cars rose for the same period – from 1,740 kg to 1,763 kg. Engine capacity of gasoline has been increased by 4.1 %, but diesel decreased by 3.5 % (2000 to 2001). In case of diesel engine capacity, the medium size HSDI (High Speed Direct Injection) diesel engine was introduced in 2001.

In addition to meeting emission regulations (EURO III & IV) and On Board Diagnostics regulation in place in the EU, KAMA members tried to reduce CO_2 emissions and improve fuel economy with various technical developments.
Although general trends in physical characteristics show an overall increase in the car average mass, engine capacity, and engine power within the reporting period, total fuel consumption for gasoline- and diesel-fuelled cars combined decreased.

E4 Technical developments introduced to reduce CO_2 emissions

KAMA members tried to reduce CO_2 emissions by applying torque based actuator control, advanced knock control system, weight reduction, advanced gasoline engine and HSDI diesel engine, and variable intake-manifold system within the reporting period.

KAMA members introduced these newly developed vehicles in the EU market from 2001. The share of cars with CO_2 level between 140 g/km and 160 g/km has increased by 78.3 % compared to 2000. HSDI diesel engines were introduced in 2001, achieving a 4.4 % share of total KAMA sales volume in 2001; the volume will steadily increase and contribute to the reduction of CO_2 in the EU market.

KAMA has still no model on the market that emits 120 g/km or less. However, in order to introduce low emission cars, KAMA members are currently developing diesel passenger cars of small displacement with common rail (2^{nd} generation of HSDI car), three-litre (3 liter/100km) cars, and HEV (hybrid electric vehicle) and fuel cell cars which will be introduced in the near future.

E5 Brief overall assessment on progress in relation to the target

Mainly due to the increased sales of mini gasoline cars on the EU market, a reduction of average specific CO_2 emissions was accomplished between 1995 and 2001, from 197 g/km to 186 g/km. To achieve the CO_2 emission targets agreed upon in the commitment by 2004 and 2009, KAMA members have begun to concentrate on fuel efficient car technologies such as, inter alia, HSDI, GDI (Gasoline Direct Injection), CVT (Continuously Variable Transmission), weight reduction, and reduction of drag force.

The sales volume in 2001 of gasoline vehicles dropped by nearly 14.9 %, and diesel registrations increased by nearly 35 % compared to 2000. KAMA members launched a number of more fuel efficient car models on the EU market in 2001. KAMA is of the view that their members had a disproportionate burden of investment to R&D with comparatively small sales volume in the EU market during past several years after economic crisis.

As the fleet composition in EU is mainly composed of fuel-efficient diesel and the sales volume of diesel has been constantly increased, so KAMA manufacturers will introduce the 2^{nd} generation HSDI engine for small size passenger cars by 2003. To meet the target in 2004 and 2009 (see Figure 3 below), it is necessary for KAMA members to increase the number of cars emitting less than 120g/km and KAMA members must increase their annual average reduction rate to around 3 %. 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, KAMA currently has no reason to believe that it would not live up to its Commitment.

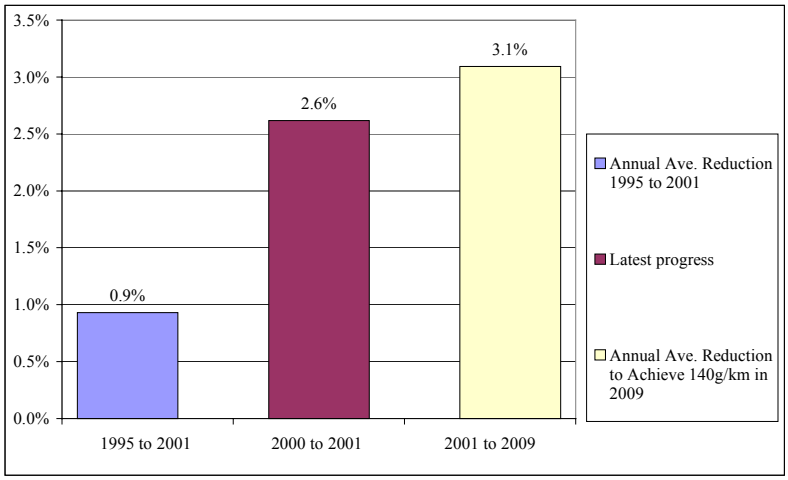


Figure 3 – The current and required annual rates of CO2 reduction

The Commission Services welcomes the reduction in average specific CO2 emissions achieved over the period 2000 to 2001. However, the Commission Services are concerned about the progress made so far over the commitment period. The Commission Services and KAMA agree that only with significant and additional efforts will the targets be met.

1. MONITORING OF TECHNOLOGICAL DEVELOPMENTS AFFECTING THE COMMITMENT

1.1. Commitment Initiatives (optional)

1.1.1 Brief Description of current R&D programmes

1.1.2 Other

KAMA members consider investments into R&D as a key element for meeting the CO_2 targets of 2004 and 2009. They have already started new R&D projects aiming at reducing passenger car's CO_2 emissions as well as other emissions.

Section 1.2 also covers KAMA's technological developments and research programme activities.

1.2. Technological developments

1.2.1. Description of CO2 emissions/fuel efficiency characteristics of new technologies, alternative concepts
1.2.2. Availability of New Technologies
1.2.3. Availability of low emission passenger cars (e.g. emitting 120 g/km or less)
1.2.4. Availability of alternative concepts passenger cars
1.2.5. Availability of innovative concept passenger cars

KAMA members have committed themselves to achieve the target (140 g/km of CO_2 emissions in 2009) and are running several R&D programmes to investigate methods to reduce CO_2 emissions by up to 20-30 % according to the car segments.

The 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_2 emission engines. There are gasoline and diesel engine concepts being under the development in addition to applying the torque based actuator control, the advanced knock control, the variable intake manifold system and HSDI diesel engine within the reporting period. KAMA members have strategies of CO_2 reduction with developing the fuel-efficient engines such as MPI engine, GDI engine, and HSDI engine, which have potentials of CO_2 reduction in 5–25 %, 13–33 %, and 10-30 % compared to conventional engines respectively.

Diesel engine with variable geometry timing system will be introduced in mid 2002 to enhance the engine performance and fuel consumption. CVVT (Continuously variable valve timing) system will be applied in the mid of 2002. Variable intake manifold system will be applied in the mid of 2002. Roller rocker arm and stop-go system and 2-Stage variable valve lift System will be applied at the end of 2003. Small displacements passenger cars with 2nd generation HSDI engine will be launched by mid 2003.
Actually one of KAMA members launched HSDI diesel cars onto the EU market at the end of 2000. KAMA is convinced that these programmes will contribute to further reducing specific CO_2 emissions.

Transmission Programme
Transmission is one of the major factors affecting CO_2 emissions. Its efficiency and speed are the main factors to be improved so as to reduce emissions. KAMA members are focusing to self-development of the CVT for the EU market. KAMA expects passenger cars applied technologies such as the line-up variable control system for the improvement of efficiency with 5-speed automatic transmission and 6-speed manual transmission will be launched onto the EU market by 2003.

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 from 2002 at the earliest.
Development of after-treatment system in parallel with CO_2 reduction to meet the stringent emission regulation, along with European OBD system for Diesel in the EU was accomplished at end of 2001 and will be launched in 2002.

Car Weight Reduction Programme
This programme is one of the major measures to contribute to CO_2 emissions reduction. KAMA members are developing aluminium bodies and chassis 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.

Reduction of Resistances Programme
In addition to the reduction of car weight, KAMA members are trying to develop new technologies such as reduction of engine friction, motor driven power steering, reduction of resistances (running and rolling) for reducing CO_2 emissions (by 5-15 %) which will be launched into EU market by 2003. Aerodynamic drag may be improved by reducing drag coefficient or modifying frontal area shape that have an effect on CO_2 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 CO_2 reduction, along with 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.

No passenger car was offered by KAMA members onto the EU market within the reporting period to meet the criteria of emitting less than 120 g CO_2/km.

1.3. 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, even though most parameters have decreased in general (see Section 2.4).

Averaged car mass reached its maximum (1,109 kg) in 1998 and increased slightly to 1,141 kg in 2001, partly due to the application of systems to meet EU regulations regarding emissions and OBD Averaged engine capacity decreased steadily after 1996 to 1,507 cm^3 in 2001.

Averaged engine power reached the maximum 71 kW in 1997 and decreased to 65 kW in 2001. The main contributor to CO_2 decrease after 1997 is sales volume increase of gasoline mini cars with engine capacities less than 1,000 cm^3.

2. STATISTICAL MONITORING (1995-2001)

2.1. Trends in specific emissions of CO_2 (g/km)

As shown in Figure 1, the average specific CO_2 emissions of passengers sold by KAMA members on the EU market increased from 197 g/km in 1995 to 203 g/km in 1997. After 1997 it decreased to 186 g/km in 2001[56]. KAMA members in the EU market achieved an average reduction in specific CO2 emissions of about 5.6 % within the reporting period. Specific CO_2 emissions from gasoline cars, which occupied most sales volumes, reached a maximum in 1997 and decreased afterwards due to the increase of mini car (<1000 cm^3) sales. Diesel cars with higher CO_2 emissions due to its heavier weight showed a sharp decrease of CO_2 emission within reporting period. Although the thermal efficiency of diesel engines is better than that of gasoline engines, their fuel efficiency was lower for diesel than for gasoline 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 in gasoline fuel consumption (see Figure 4).

The overall CO_2 emission of KAMA shows a steady decrease since 1999 and the CO_2 reduction rate of KAMA in 2001(2.6 %) is the largest drop during monitoring period of 1995-2001.

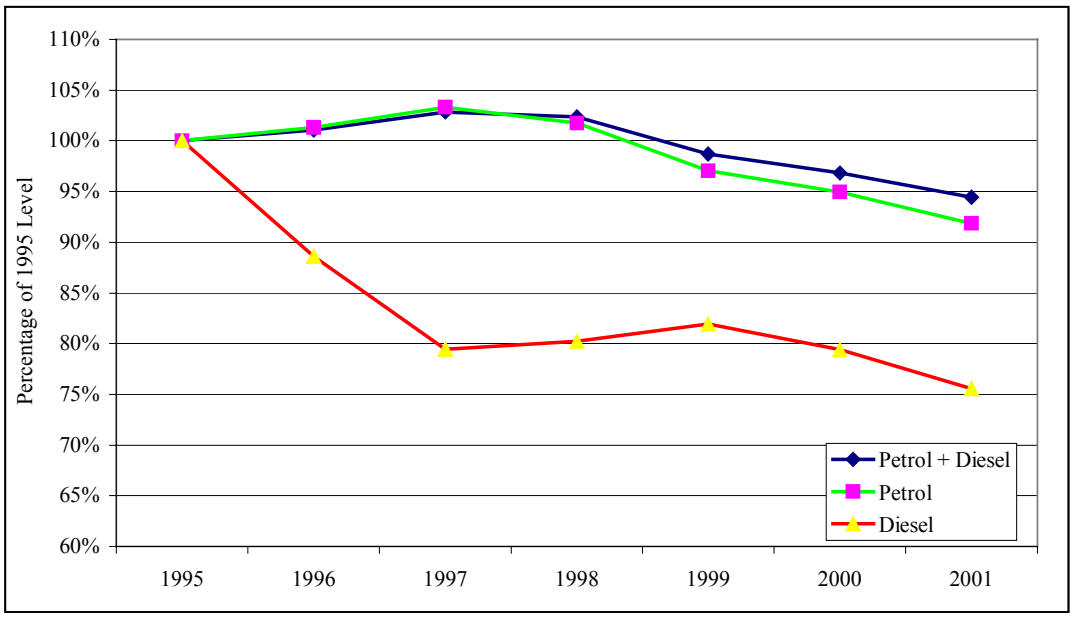


Figure 4 : KAMA's CO_2 Reduction Index (1995= 100)

2.2. Number of newly registered passenger cars

Total new car registration by KAMA was 396,792 in 2001, down by 19.2 % from 2000 registrations (491,244). Gasoline cars represented the largest share of new registrations - 85.2 % in 2001 (compared to 80.9 % in 2000). In particular, the sales volume share of mini cars has increased since 1998 and reached to 126,166 in 2001 – a share of 31.8 % of total car sales - and contributed to lower CO_2 emissions.

[56] KAMA's 2001 CO2 performance figures have been adjusted by KAMA for the estimated effects of the mandatory drive cycle change, progressively introduced from January 2000 (see Section 2.11).

The number of diesel passenger cars sold increased from 40,769 in 2000 to 55,219 in 2001 (up 35.4 %). Although this represents only a small portion of KAMA registration (13.9 %) – the higher specific emissions of KAMA diesel cars slightly affected the reduction of CO_2 emissions (see Figure 4).

There were few "other cars" - 2,947 in 2000 and 941 in 2001 that represent those cars of which the fuel type is identified but CO_2 emissions– and there was a significant number of "unknown cars" (dropping from 50,143 in 2000 to 2,539 in 2001) which is mainly due to lack of detailed data (2,487) for Greece.

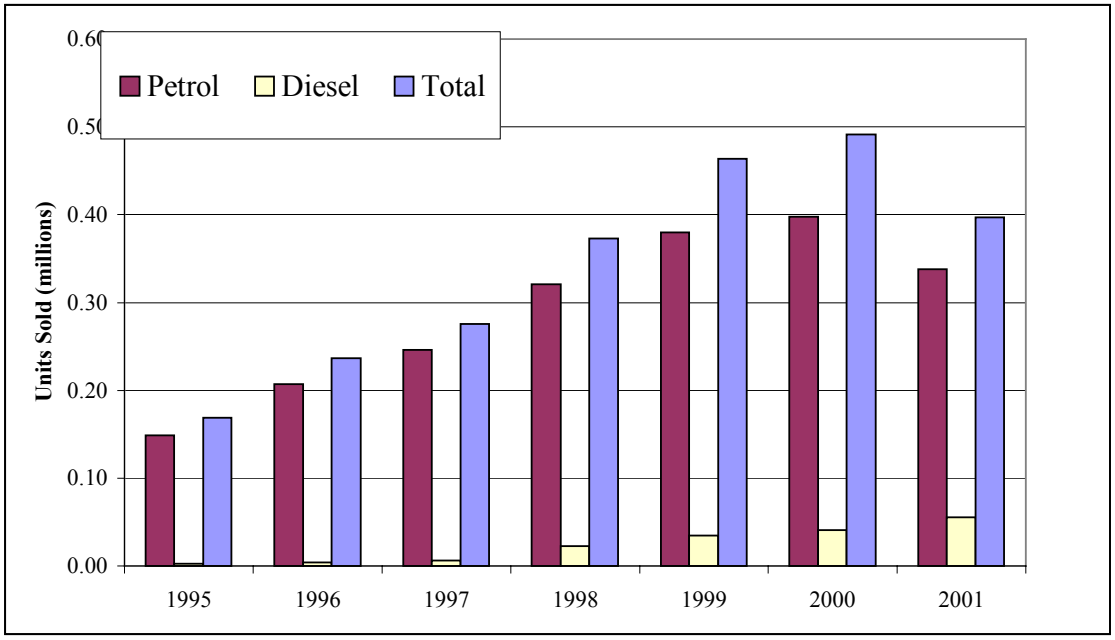


Figure 5 : Number of Newly Registered Passenger Cars by KAMA[57]

2.3. Fleet Composition

KAMA's fleet composition has changed towards more fuel-efficient cars over the reporting 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 +4.6 % over the period 1995 to 2001 – from 3.1% to 7.7%)). The share of cars in the lowest category 141-160 g/km has increased to 44.7 % in 2001 from 9.2 % in 1995, which mainly contributed to reducing CO_2 emission (see Figure 6).

[57] The difference between the "total" registrations and the "gasoline + diesel" registrations is mainly due to the unknown cars (2,539 units in 2001).

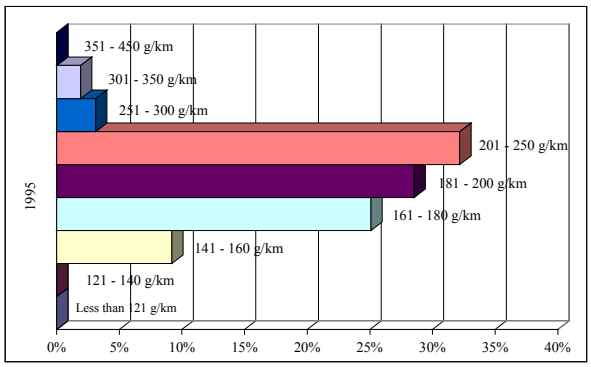


Figure 6a : KAMA's Fleet Composition per CO_2 Category in Shares of Total (gasoline+diesel) in 1995

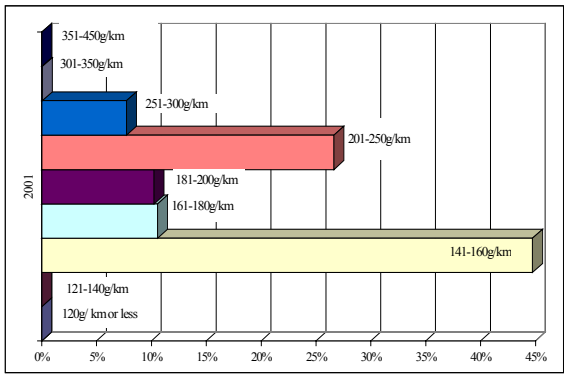


Figure 6b : KAMA's Fleet Composition per CO_2 Category in Shares of Total (gasoline+diesel) in 2001

In 2001, KAMA's CO_2-related fleet composition continued to show a move towards more fuel-efficient cars, with 160g or below car sales rising by almost 44% on 2000. KAMA members sold 175993 cars of 160g or below in 2001 (up by 92.1 % on 1995). These cars accounted for 44.8% of total petrol & diesel sales in 2001, up from 22.5% in 2000, and 9.2% in 1995.

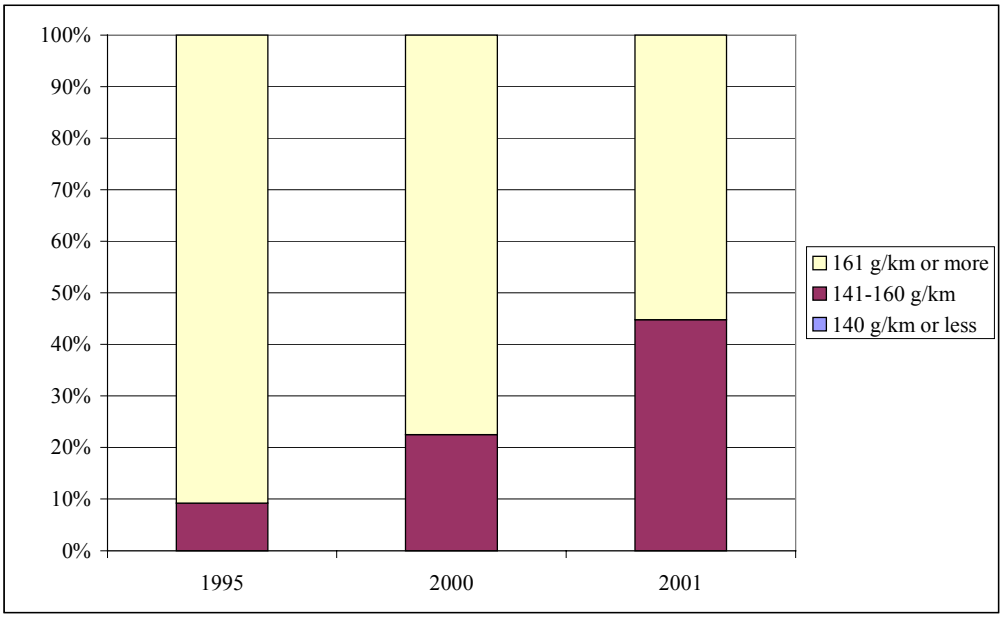


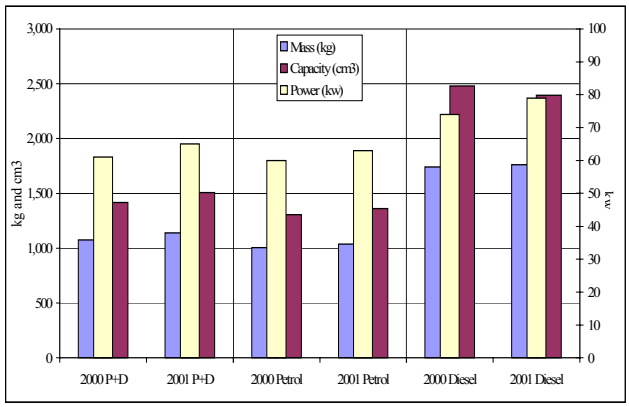
Figure 6c Change in KAMA's Fleet Composition between 1995, 2000 and 2001 by "aggregated CO_2 Categories":

2.4. EU trends in physical fleet characteristics

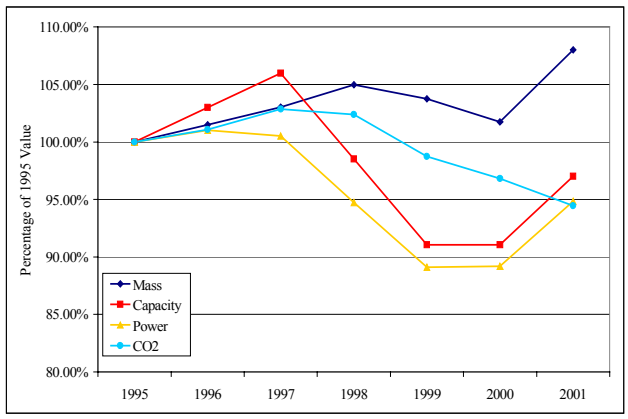
Average total car mass was 1,057 kg in 1995 and increased to 1,141 kg in 2001 - KAMA note that this is in part due to application of systems to meet EU's new emission regulations within the reporting period (see Figure 7). Gasoline cars reached the maximum average mass of 1,074 kg in 1997 (against 1,043 kg in 1995) and decreased to 1,038 kg in 2001, i.e. decreased by 0.5 % within the reporting period. Diesel car average mass reached the minimum of 1,630 kg in 1997 (against 1,789 kg in 1995) but increased to 1,763 kg in 2001; i.e. decreased by 1.5 % within the reporting period. The overall trend in average mass shows very low variations over the 1995-2001 period.

Total engine capacity has steadily decreased from 1,589 cm^3 in 1995 to 1,507 cm^3 in 2001 (with a slight increase in 1996). Gasoline 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. 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. The overall trend shows some reasonable variations in engine capacity over the reporting period, mainly due to a more significant drop (-13.2 %) in gasoline engine capacity and a 12.4 % drop diesel engine capacity since 1995.

Total engine power reached the maximum 71 kW in 1997 (against 67 kW in 1995) and decreased to 65 kW in 2001 i.e. decreased by 3 % over the reporting period. Gasoline engine reached the maximum 71 kW in 1997 (against 67 kW in 1995) and decreased to 63 kW in 2001, i.e. decreased by 6.0 % over the reporting period. Diesel engine power has substantially increased by 19.7 % within the reporting period, i.e. from 66 kW in 1995 to 79 kW in 2001. The overall constancy of average engine power of KAMA's fleet has not been influenced by the upward trend in diesel engine power (see Figure 7).



Figures 7a: Physical KAMA fleet characteristics for 2000 & 2001



Figures 7b: Physical KAMA fleet characteristics 1995 to 2001 (percent of 1995 values)

2.5.Trends in new technologies

KAMA members tried to apply several techniques to reduce CO_2 emissions 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 sales vary across the applied technologies.

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

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

Share of mini cars has increased since 1998 from 14 %, 20.1 % in 2000, and 31.8 % in 2001.

Shares of variable intake-manifold system and HSDI diesel engines introduced the first in 2001 were 1.3 % and 4.4 % of total KAMA sales registered in 2001 respectively and the volume will be expected steadily to increase in the EU market.

2.6 Trends in low emission passenger cars

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

2.7 Trends in alternative concepts passenger cars

KAMA members are developing HEV and planning to launch on EU market in 2004 at the earliest.

2.8 Trends in innovative concept passenger cars

Nothing to report.

2.9 Brief Description of the degree of occurrence of Grey Areas between M1 and N1 vehicles in the Member States

The number of M1 vehicles potentially registered as N1 was about 6.3 % of total new registrations. Around 24,999 vehicles sold by KAMA in the EU are understood to be "grey area vehicles" – in other words were registered as N1 vehicles. This relates primarily to the Spanish (12,228 units) and Portuguese (4,204 units) markets, and to a lesser extent Italian (3,189 units) markets. Three models account for the majority of the grey area vehicles.

2.10 Data sources, data methods and data confidence levels

2.10.1 Data Sources

2.10.2 Data Methods

2.10.3 Data confidence levels

KAMA has utilised in this report CO_2 statistics supplied by the French-based association AAA (Association Auxiliaire de L'Automobile), same as for 1999 and 2000 data.

AAA's CO_2 database covers around 90 % of the EU and the rest are unknown figures, and are widely regarded as one of the most reliable data sources currently available.

KAMA has also utilised in this report CO_2 statistics for Greece supplied by alternative reliable sources such as Marketing System and JATO Dynamics, and incorporated them into AAA data according to the Commitment and the monitoring procedure since market share in Greece is 10.1 % of KAMA sales volume in the EU market and gives big influence to the fleet CO_2 reduction.

KAMA agrees to base the 2002 data for annual monitoring in 2003 exclusively on EU Member States' data delivered under Decision 1753/2000.

During 2001 the car manufacturers' associations have worked jointly with the Commission to develop future monitoring guidelines in a number of areas[58]. Good progress could be made and a final set of criteria will most likely be adopted in 2002, see Annex.

[58] This work is based on the "Exchange of Letters" which requires that "To ensure the monitoring system's effectiveness, joint agreements will be reached on the inclusion of: innovative concepts, cars using alternative fuels or propulsion systems; as well as on new and changed test procedures"

2.11 Description of measurement issues for CO_2 Emission Factors

KAMA's CO_2 emissions figures have been established according to Directive 93/116/EC[59], 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 CO_2 emissions are higher under the new system. The implementation of this new measuring procedure has led to an artificial average increase of the CO_2 emission figures, compared to the previously used Directive, whereas the CO_2 emissions from cars in the real world have not changed.

Since January 2000, new model introduction homologations of M1 vehicles up to 2500kg have had their CO_2 emissions measured according to the new directive/cycle (99/100/EC). A correction factor needs to be applied to the measured CO_2 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. Estimation for the effect of the cycle change varies between 0.7 %[60] (Commission estimate) and 1.2 %.[61]

For 2001 KAMA instructed AAA to reduce 2001 data collected for M1 vehicles up to 2,500 kg identified to have been tested under the new text procedure by an average 1 % "correction factor" to allow the data to be comparable to the test cycle EU 93/116/EC specified in the Commitment.

The Commission does not agree to this adjustment because the correction factor should be 0.7%[62] and not 1.0%. The Commission believes that the CO2 emissions of KAMA's newly registered cars should be reduced by an agreed and appropriate correction factor (see Year 2000 Joint Report). As long as no agreement exists no correction should be applied.

2.12 Other Issues

KAMA has no other issues regarding statistical monitoring.

[59] The Directive in force at the time of the KAMA Commitment.
[60] TNO (2000): "Correlation analysis between different test cycles, and options to take into account innovative vehicle concepts for the determination of the CO2 emissions" Final report to study contract XI/D3/ETU/990067. .
[61] Based on EU manufacturers' assessment in the EU.
[62] TNO (2000). See reference in footnote 11.

3. KEY ASSUMPTIONS TO THE COMMITMENT

3.1. Availability of Enabling Fuels

According to KAMA, fuel quality has become a critical CO_2 emission Commitment issue[63]. An assessment will be made as to whether the assumption in KAMA's Commitment is being met; namely the full market availability of fuels with a sufficient quality to enable the application of technologies needed for the industry in order to achieve its CO_2 commitment. At that time suppliers of catalyst technology considered their technology could cope with 30 ppm sulphur fuels.

In addition, new fuel-efficient lean-burn engine technologies need to use after-treatment systems (NOx traps, particulate filters and conventional catalysts) to meet CO_2 and tailpipe emissions at the same time. Therefore "Zero Sulphur Fuel" (less than 10 ppm sulphur) will be required to meet stringent 2005 EU tailpipe emission standard and 140g/km target as sulphur contaminates after-treatment systems and significantly reduces their efficiency. KAMA underlines that any problems that might arise with respect to the fuel quality will have to be considered in the monitoring procedure.

The Commission draws attention to its "zero sulphur fuels" proposal, see COM(2001)241 final. It should be noted that the current Fuels Directive discussions on a "Common Position" centre on the final date at which 100% of all fuel must be less than 10 ppm or "sulphur free". Both fuels must be introduced no later than 2005, and in a number of Member States measures are ongoing to do so even earlier. The mandatory date for 100% availability is 2009 for gasoline and diesel, subject to a review process for diesel fuel. The Commission draws attention to the fact that the provision of 10 ppm fuels goes well beyond the expectation at the time of the signature of the Commitment.[64] Moreover it underlines that it has no doubt that these fuels would be available in sufficient quantities throughout the Community from 2005 onwards and no hampering of the introduction of new technologies is to be expected.

3.2. Distortion of Competition

Nothing to report.

3.3. Promotion of CO_2 efficient technologies

Cars with low CO_2 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 CO_2 emission in the near future. KAMA members have high expectations for certain technologies; in particular those associated with direct injection engines.

[63] It should be mentioned that the fuel quality does not create any problem for the figures shown in the report. The test fuels are sulphur-free since long allowing the manufacturers to take full advantage of their technology. However, the performance of cars would be less efficient under real world conditions, see COM(2001)241 final.
[64] See COM(2001)241 final.

It is the Commission's opinion that KAMA was fully aware of the emission standards laid down in the amended Directive 70/220/EC[65].

3.4. Acceptance of innovation

Nothing to report

[65] The Commission draws attention to the following facts: The third reading of the EP took place on 15.9.1998 and the Directive was published in the Official Journal on 28.12.1998. KAMA made its commitment on 11.6.1999.

6. OTHER ISSUES

4.1. New Measures affecting CO_2

Nothing to report

4.2. New regulatory measures

More stringent regulations of emissions, safety, and recycling can affect the effort to reduce CO_2 emissions. 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 CO_2 emissions. 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 CO_2 efficient technologies.

KAMA anticipates that the End-of-Life Vehicle (ELV) Directive[66] 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 impose a financial burden significantly 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 gasoline engines simultaneously fulfilling the required NOx level and offering the fuel consumption improvements on the fuel qualities specified. The key point is that emissions, CO_2 and fuels are intrinsically linked, and KAMA members needs 100 % availability of fuel with less than 10ppm or "sulphur free", in order to meet both the stringent 2005 EURO-IV tailpipe emission standards and 140 g/km CO_2 commitment (see also Section 3.1). The CO_2 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[67] at the time it signed the Commitment and that the introduction of 10 ppm fuel's goes

[66] Directive 2000/53/EC
[67] Directive 98/69/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.

4.3. Fiscal Measures

Nothing to report

4.4. Breakthrough technologies

Nothing to report

4.5. Research Programmes: Description and Future Potential

KAMA members have committed themselves to achieve a target (140 g/km of CO_2 emissions in 2009) and are running several R&D programmes to investigate methods to reduce CO_2 emissions 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 CO_2 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 (Continuously Variable Valve Timing), Advanced reduction of engine friction, Reduction of resistances (Running and Rolling) for reducing CO_2 emissions (by 5 to 15 %), Motor driven power steering which will be launched into EU market by 2002 at the earliest and Small vehicle with 2nd HSDI engine, Roller rocker arm and Stop-go system for reducing CO_2 emission (by 10 to 15 %) which will be launched into EU market by 2003.

4.6. Other measures - telematics, infrastructure, education

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 CO_2 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 CO_2 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.

6.1 **Economic situation of the car industry**

The Korean economy hit the bottom and there are apparent signs of recovery from financial crisis at the end of 1997, and even some industry sectors are overheated with rapid boom of demands. However, the Korean economic situation is still vulnerable to other impacts. The unstable stock market, increase of individual bankruptcies, widening gap of haves and have-nots, sharply appreciating foreign exchange rate, declining economies in the US and Japan, all these are factors affecting negatively the automobile industry.

During the past several years Korea's automobile industry underwent dramatic changes in the wake of financial crisis at the end of 1997. Bankruptcies, mergers and acquisitions, and strategic alliances were the outstanding features of the Korean automotive industry. The impact of such realignments is quite extensive[68]. Industry analysts predict that it will take a few more years to come until the industry will be back on track.

During the process of the restructuring the Korean auto industry suffered severely from drastic budget cuts, mass lay-offs, and depletion of resources for investments and erosion of their capabilities, in particular, in research and development of CO_2 efficient technologies.

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 was a disproportionate burden of investment during past several years after economic crisis.

In these circumstances, KAMA requests that economic factors may have to be duly considered in the monitoring of CO_2 emission reduction from passenger cars.

The Commission draws attention to the fact that one Korean manufacturer, contributing most to the total market share of KAMA on the EU market, achieved record profits in 2001. Another major manufacturer should have a more stable financial base than previously, after having been acquired by a foreign manufacturer. Lastly Koreas auto trade surplus remain at a very 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.

[68] Very recently Daewoo Motor Company, one of the major players in Korea, was taken over by General Motors. Now the Korean car market is a place of fierce competition where two domestic manufacturers and two foreign-allied ones coexist.

7. CONCLUSIONS

5.1. Progress Statement on Delivering the Commitment

KAMA members are encouraged to concentrate on CO_2 emission reductions by developing fuel-efficient cars. KAMA members achieved an average reduction in specific CO2 emissions of 2.6 % for the period 2000 to 2001; this is the highest rate of improvement achieved so far over the reporting period 1995-2001.

When the fleet composition is considered (see Section 2.3), an outstanding feature is the sharp increase of the share of low CO_2 cars emitting less than 160 g/km, which shows the endeavour and will of KAMA members to meet the Commitment.

5.2. Statement on Expected Future Progress of the Commitment

It is encouraging to see that the reduction of CO2 emissions achieved in 2001 is the biggest yearly reduction so far. Having said that, 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, this target 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 CO_2 efficient technologies. One of KAMA members developed HSDI diesel cars and launched at the end of 2000, which contributed to the reduction of CO_2 emission as a start of new technology. KAMA members have agreed to make every endeavour to contribute to the achievement of KAMA's goals.

Although the current status in fuel-efficient car technologies in Korea lags several years behind those of European automobile manufacturers, KAMA members try to increase the sales volume of fuel-efficient cars and will introduce the 2^{nd} generation HSDI engine for small size passenger cars till 2003.

KAMA members must increase their annual average reduction by 5-6 g/km with developing cars emitting less than 120g/km to meet the CO_2 target of 2009 and expect the reduction rates will be increased with the acceleration of technology development as time goes on. In summary, KAMA currently has no reason to believe that it would not live up to its Commitment.

The Commission Services welcomes the reduction in average specific CO2 emissions achieved over the period 2000 to 2001. However, the Commission Services remain concerned about the progress made so far over the commitment period. The Commission Services and KAMA agree that only with significant and additional efforts will the targets be met.

Annexes

Monitoring rules established in accordance with the "Exchange of Letters"

7) Direct/indirect CO2 emissions: Indirect CO2 emissions caused due to primary energy and fuel production, as well as potential savings due to the use of biofuels etc, will not be taken into account within the monitoring; the commitments apply solely to the CO2 emissions of the vehicle.

8) Bi-fuel CNG and LPG passenger cars: From the two CO2 values associated with the usage of one or the other of the two fuels, the value of the fuel will be taken into account in the monitoring for which the fuel price at the pump, expressed in the caloric equivalent, is lower[69]. If necessary a differentiation among Member States will be made.

9) Electric and hydrogen vehicles with external hydrogen supply: These vehicles will be considered as zero-CO2-emission vehicles and counted towards the achievement of the target as long as the share of these vehicles is low[70]. In case the sales volume share becomes significant only a share of these vehicles will be counted towards the achievement of the target value (see assumption D of the Commitments). The need and, if necessary, the level of the threshold for the share of these vehicles will be discussed in the 2003 major review[71].

[69] It is expected, that customer will run the car on the alternative fuel, as long as total fuel costs, taking into account the fuel consumption and the necessary fuel volumes to operate the vehicle, remain lower than for the conventional fuels.
[70] This applies to bi-fuel hydrogen vehicles with a range of at least 150 km as well.
[71] ACEA explained that only a few thousand vehicles of these types are registered every year within the EU in total. Based on this number it was decided that these vehicles would be counted towards the achievement of the target until 2003 in any case.

KAMA
Data Annexes
2001

KAMA Data Annexes (2001)

A1 : SPECIFIC FUEL CONSUMPTION AND EMISSIONS OF CO_2 AVERAGED OVER ALL NEWLY REGISTERED PASSENGER CARS FOR EACH DIFFERENT FUEL-TYPE, FOR THE EU AND EACH MEMBER STATE

A2 : THE DISTRIBUTION OF CO_2 EMISSIONS IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

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

A3a. The Distribution of New Passenger Cars: by Average Mass (kg)[72]

A3b. The Distribution of New Passenger Cars: by Average Engine Power (kW)

A3c. The Distribution of New Passenger Cars: by Average Engine Capacity (cm3)

A4: EU LIST OF M1 VEHICLES POTENTIALLY REGISTERED AS N1 (BY MODEL) IN EACH MEMBER STATE

[72] Curb weight of vehicles.

A1. SPECIFIC FUEL EFFICIENCY (L/100) 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

2001 – KAMA MEMBERS

	Total	Identified version										unknown version
		Petrol			Diesel			Petrol + Diesel			Other	
Member State	Number	Number	average Fuel	average CO2	Number	Average Fuel	Average CO2	Number	average Fuel	average CO2	Number	Number
EU-15	**396,792**	**338,093**	**7.3**	**179**	**55,219**	**8.8**	**234**	**393,312**	**7.5**	**186**	**941**	**2,539**
A	5,472	3,003	7.4	179	2,467	8.2	216	5,470	7.7	196		2
B	8,479	6,837	7.4	184	1,578	7.8	205	8,415	7.5	188	61	3
DK	3,478	3,370	7.5	180	105	8.5	223	3,475	7.5	182		3
F	21,361	10,491	7.4	182	10,077	9.5	250	20,568	8.4	215	793	
FIN	294	293	8.6	204	1	8.6	225	294	8.6	204		
GER	49,888	37,149	8.2	197	10,252	9.3	245	47,401	8.5	207		2,487
GR	39,895	39,837	6.8	167	37	8.8	238	39,874	6.8	167		21
IRE	7,225	6,977	7.6	187	246	8.0	212	7,223	7.6	188		2
IT	96,443	80,955	6.7	166	15,397	8.9	235	96,352	7.0	177	87	4
LUX	1,069	685	7.4	177	384	7.9	209	1,069	7.6	188		
NL	23,751	23,105	7.5	183	637	8.1	214	23,742	7.5	184		9
P	7,193	6,334	6.8	165	859	8.0	211	7,193	6.9	171		
SP	66,086	57,591	7.4	182	8,488	8.3	220	66,079	7.5	187		7
SW	7,747	7,564	8.3	196	183	8.5	224	7,747	8.3	197		
UK	58,411	53,902	7.6	184	4,508	8.5	224	58,410	7.6	187		1

THE DISTRIBUTION OF CO_2 EMISSIONS IN THE NEW PASSENGER CAR FLEET FOR EACH DIFFERENT FUEL TYPE, FOR THE EU

KAMA MEMBERS: 2001

CO2 (category)	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	Number	Average CO2	Number	Average CO2	Number	average CO2
101 - 120	0	N/A	0	N/A	0	N/A
121 - 140	0	N/A	0	N/A	0	N/A
141 - 160	**174,538**	**153**	**1,455**	**156**	**175,993**	**153**
161 - 180	38,067	170	3,497	167	41,564	170
181 - 200	30,463	191	9,826	196	40,289	192
201 - 250	82,873	219	21,857	230	104,730	221
251 - 300	11,864	268	18,535	277	30,399	273
301 - 350	259	313	49	304	308	312
351 - 450	29	363	0	0	29	363
> 450	0	N/A	0	N/A	0	N/A

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

A3a. The Distribution of New Passenger Cars: by Average Mass (kg)[1]

KAMA MEMBERS: 2001

Member State	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	Average mass	average CO2	Average Mass	average CO2	Average mass	average CO2
EU-15	**1,038**	**179**	**1,763**	**234**	**1,141**	**186**
A	1,103	179	1,709	216	1,376	196
B	1,069	184	1,645	205	1,177	188
DK	1,083	180	1,857	223	1,106	182
F	1,054	182	1,732	250	1,386	215
FIN	1,318	204	2,043	225	1,321	204
GER	1,218	197	1,787	245	1,341	207
GR	985	167	1,570	238	985	167
IRE	1,145	187	1,762	212	1,166	188
IT	918	166	1,787	235	1,057	177
LUX	1,118	177	1,697	209	1,326	188
NL	1,078	183	1,718	214	1,095	184
P	958	165	1,503	211	1,023	171
SP	1,043	182	1,749	220	1,134	187
SW	1,239	196	1,747	224	1,251	197
UK	1,062	184	1,854	224	1,123	187

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

A3b. The Distribution of New Passenger Cars: by Average Engine Power (kW)

KAMA MEMBERS: 2001

Member State	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	average Power	average CO2	average Power	average CO2	average Power	average CO2
EU-15	**63**	**179**	**79**	**234**	**65**	**186**
A	63	179	80	216	71	196
B	64	184	79	205	67	188
DK	72	180	89	223	73	182
F	65	182	77	250	71	215
FIN	95	204	110	225	95	204
GER	79	197	80	245	79	207
GR	57	167	66	238	57	167
IRE	69	187	85	212	70	188
IT	50	166	78	235	55	177
LUX	68	177	79	209	72	188
NL	65	183	82	214	65	184
P	54	165	69	211	56	171
SP	66	182	76	220	67	187
SW	81	196	82	224	81	197
UK	67	184	90	224	69	187

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

A3c. The Distribution of New Passenger Cars: by Average Engine Capacity (cm3)

KAMA MEMBERS: 2001

Member State	Identified version					
	Petrol		Diesel		Petrol + Diesel	
	average Cm3	average CO2	average Cm3	Average CO2	average Cm3	average CO2
EU-15	**1,361**	**179**	**2,396**	**234**	**1,507**	**186**
A	1,440	179	2,317	216	1,836	196
B	1,399	184	2,079	205	1,526	188
DK	1,532	180	2,698	223	1,567	182
F	1,396	182	2,382	250	1,879	215
FIN	1,940	204	2,902	225	1,944	204
GER	1,696	197	2,477	245	1,865	207
GR	1,257	167	2,009	238	1,258	167
IRE	1,478	187	2,241	212	1,504	188
IT	1,096	166	2,320	235	1,291	177
LUX	1,469	177	2,090	209	1,692	188
NL	1,422	183	2,272	214	1,445	184
P	1,194	165	1,931	211	1,282	171
SP	1,420	182	2,454	220	1,553	187
SW	1,749	196	2,142	224	1,758	197
UK	1,433	184	2,693	224	1,530	187