

UK New Car Registrations by CO₂ Performance

2004 Annual Report



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Overview

- Third review of UK new car markets CO₂ performance.
- Average new car CO₂ emissions continue to improve.
- Pace of reductions easing, reflecting trends in market preferences.
- Shift to diesels and introduction of lower CO₂ emitting vehicles helping net improvement.
- Further declines expected in UK average, but major reductions may require shift in consumer attitudes.

This third annual review of the new car market by CO₂ performance reveals a continuation of the trend evident since SMMT started reporting average new car CO₂ emissions, of a steady reduction. Between 1997 and 2003 the average new car CO₂ have fallen by over nine per cent and in 2003 dipped a further 1.2 per cent from the 2002 rate to 172.1g/km.

CO₂ figures have been the basis for vehicle excise duty and company car tax since 2001 and 2002 respectively, and whilst the figures have been steadily falling long before the introduction the new tax structures have placed even greater emphasis on a car's CO₂ rating. It is noticeable that the shift into lower tax bands has been particularly rapid.

SMMT believes the database it has compiled is the most accurate and reliable on offer and therefore gives the best source for analysing the UK's performance over the past seven years.

The data is collated by SMMT's Motor Vehicle Registration Information Service (MVRIS) department. It links the vehicles CO₂ levels to the MVRIS new car registration database. The information in this report looks at the overall new car markets and does not differentiate for individual manufacturers or groups of manufacturers (eg ACEA, JAMA or KAMA members).

For specific tailored reports by CO₂ performance contact co2@smmt.co.uk.

Accuracy of data

Data is sourced from manufacturers' own CO₂ figures, supplied on the first registration document and checked with type approval data from the VCA to ensure accuracy. For 2003 any missing data was estimated by using other models in the range or using models of a similar segment/engine size and type.

Number of vehicles with fully checked CO₂ data

	CO ₂	All Registrations	% of total
1997	1,742,251	2,170,725	80.3%
1998	1,993,301	2,247,402	88.7%
1999	2,125,465	2,197,615	96.7%
2000	2,212,786	2,221,647	99.6%
2001	2,457,368	2,458,769	99.9%
2002	2,562,764	2,563,631	100.0%
2003	2,579,050	2,579,050	100.0%

Average new car emissions

- In 2003 a new car on average emitted 172.1 g/CO₂ per km.
- This level was down 1.2 per cent on 2002 and 9.3 per cent on our 1997 baseline.

Average new car CO₂ emissions in the UK (1997-2003)

Year	Average CO ₂ g/km	y/y % change	% change on 1997
1997	189.8	-	-
1998	188.4	-0.7%	-0.7%
1999	185.0	-1.8%	-2.5%
2000	181.0	-2.2%	-4.6%
2001	177.6	-1.9%	-6.4%
2002	174.2	-1.9%	-8.2%
2003	172.1	-1.2%	-9.3%

In every year since SMMT has been monitoring average new car CO₂ emissions the average annual rate has fallen. This reflects a number of factors involving technological improvements and market shifts. During 2003 the continued shift to diesels, enhanced environmental technologies and a further shift to superminis helped continue the annual declines in average new car CO₂ levels.

In 2003 the market also moved strongly towards MPVs and 4x4 style vehicles, which tend to be at the higher end of the CO₂ ratings. However, there too significant progress have been made, with a downsizing of vehicles within those markets, a greater shift to diesel and general improvements in fuel efficiency, better aerodynamics and the use of lightweight materials.

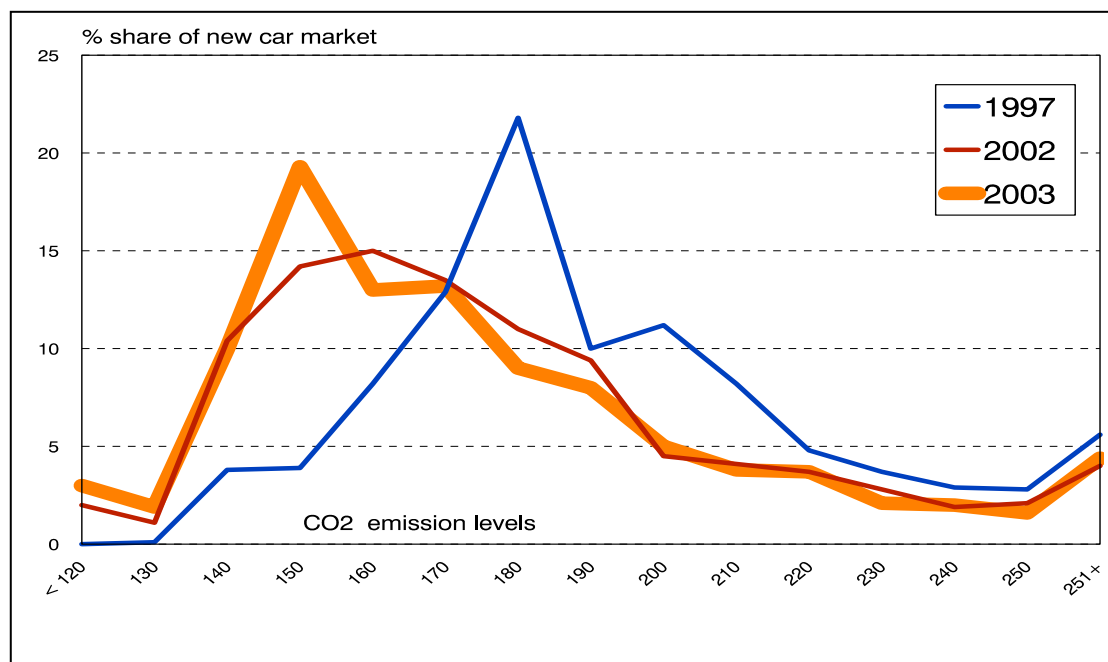
Whilst the progress remains steady, achieving further gains in CO₂ reductions remains hard work. Manufacturers have brought to the market ultra-low CO₂ emitting vehicles, and alternative fuelled cars. The next steps are to further encourage their use and also to speed up the introduction of zero sulphur petrol, which brings CO₂ benefits.

CO₂ profile of the new car market

- The proportion of the market under 140 g/km has risen to 14.9 per cent.
- Shape of distribution moving to the left, as market made up of lower CO₂ emitting vehicles. Key 'hump' now around 150g/km, versus 180g/km in 1997.
- Three per cent of market under 120g/km and 590 cars were sub 100g/km.

A greater proportion of cars are now below 140g/km than ever before and an increasing number of ultra-low CO₂ emitters are entering the market place. In 1997 less than four per cent of all cars were sub 140g/km emitters, by 2001 just over 10 per cent of new cars were and by 2003 the level reached almost 15 per cent. The chart below shows the distribution of the market by CO₂ bands. The big peak in 1997 was around the 180g/km level. By 2003 the peak was down around the 150g/km mark.

CO₂ distribution of new car registrations in the UK (1997 – 2003)



By 2003 over 77,000 cars were registered, or three per cent of the market, with CO₂ values below 120g/km. This compares with none in 1997, just 3,000 in 2000, and 52,000 in 2002. There continues to be a tail of higher CO₂ emitters, however, which fulfil the niche requirements for larger cars.

Vehicle Excise Duty profile of the new car market

- CO₂ based VED scheme in place since 1 March 2001.
- Market continues to migrate into the lower CO₂ bands.
- VED amongst measures helping entice consumers into lower CO₂ emitters.

Since March 2001 the UK has had a VED scheme based upon CO₂ emissions for new cars. This replaced the banded scheme based on engine size, which has been retained for existing cars. In general, the rates are the same or lower than the standard VED charge of £165. Alternative fuel cars get a £10 discount compared with petrol cars, while diesel-fuelled cars face a £10 penalty. Since 2001 two further categories AA for cars emitting under 120g/km and AAA for cars sub 100g/km have been introduced.

Annual VED payable on new cars

	AAA	AA	A	B	C	D
CO ₂ g/km	Up to 100	101-120	121-150	151-165	166-185	Over 185
AFV	£55	£65	£95	£115	£135	£155
Petrol	£65	£75	£105	£125	£145	£160
Diesel	£75	£85	£115	£135	£155	£165

The table below shows that the market has been shifting into the lower bands. It is highly visible that the market has swiftly moved from being predominantly in band D into band A. This shift was, however, already under way prior to 2001. Whilst the proportion in the AAA band remains minute (590 units), it is growing. The AA band has also gone from zero per cent in 1999 to three per cent by 2003.

New car market distributed by VED band

Band	1997	1998	1999	2000	2001	2002	2003
AAA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
AA	0.0%	0.0%	0.0%	0.1%	0.6%	2.0%	3.0%
A	7.8%	8.9%	11.8%	19.2%	23.1%	25.8%	31.2%
B	15.1%	18.0%	25.0%	23.8%	23.8%	24.3%	21.2%
C	32.0%	31.2%	25.8%	22.7%	20.6%	19.0%	17.8%
D	45.1%	41.9%	37.4%	34.3%	31.8%	28.8%	26.8%

Company car tax profile of the new company car market

- Company car taxation was radically altered to become based on CO₂ emissions on 1 April 2002. A driver in the minimum band is taxed (at 23 or 40 per cent) on 15 per cent of the vehicles list price (unless diesel car then minimum is 18 per cent), to a maximum of 35 per cent.
- Bands are to be cut by 10g per annum, till 2005/06 when the cut will be 5g. In 2003/04 the starting rates was 155g/km.
- Company cars account for over half of the UK new car market.
- Almost 40 per cent of the company car market is currently in the lowest tax band.
- Since April 2003 fuel benefits have also been based on a cars CO₂ performance.

New company car market by CO₂ tax bands

CO ₂ Value	Tax Basis ¹	2002 distribution ²	2003 distribution
Up to 155g	15%	34.2%	39.4%
156-160g	16%	7.3%	7.0%
161-165g	17%	8.2%	8.9%
166-170g	18%	3.5%	4.8%
171-175g	19%	7.7%	5.9%
176-180g	20%	5.4%	4.6%
181-185g	21%	4.3%	4.2%
186-190g	22%	6.7%	4.4%
191-195g	23%	3.3%	3.5%
196-200g	24%	1.9%	2.3%
201-205g	25%	2.4%	2.2%
206-210g	26%	2.0%	1.2%
211-215g	27%	1.4%	1.7%
216-220g	28%	2.0%	1.6%
221-225g	29%	1.1%	0.8%
226-230g	30%	1.4%	1.0%
231-235g	31%	1.0%	0.8%
236-240g	32%	0.8%	1.0%
241-245g	33%	1.1%	0.5%
246-250g	34%	1.0%	0.9%
251g+	35%	3.2%	3.4%

¹ diesel has 3 per cent tax supplement, up to max 35 per cent tax

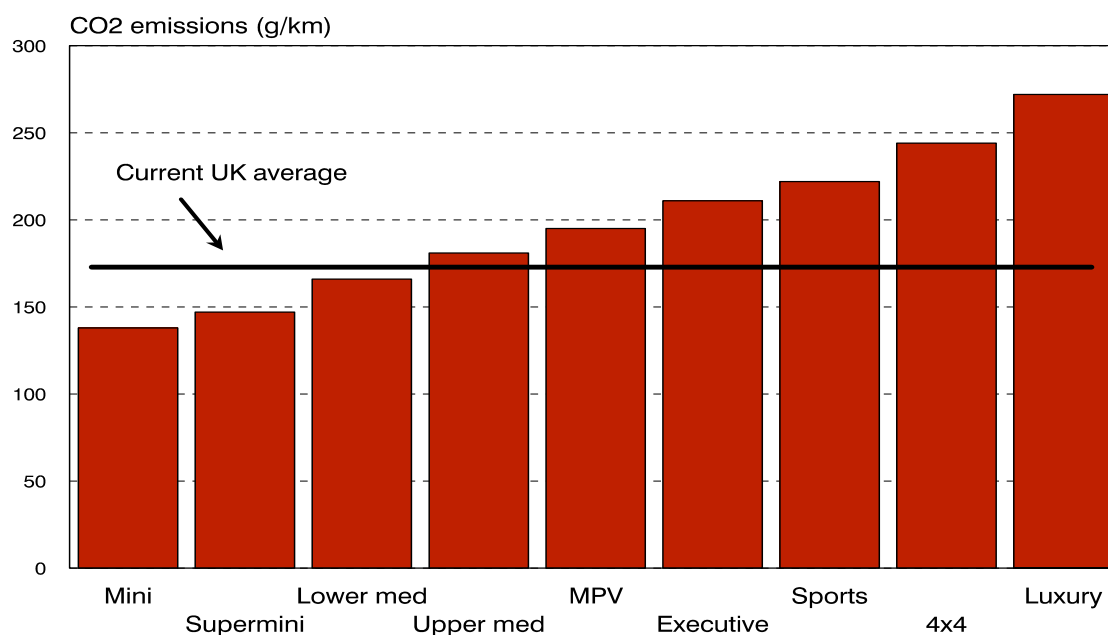
² In 2002/03 the actual base point for taxation was 165g/km

CO₂ performance by segment

- Smaller cars tend to have lower CO₂ emissions, thanks to their lighter weight.
- Mini segment cars have lowest average CO₂ emissions – at below 140g/km.
- Superminis CO₂ levels almost 15 per cent below market average, and in 2003 they accounted for a record 33.9 per cent market share.
- In 2003 all bar the sports and 4x4 segments bettered the overall market's pace of decline.
- Luxury cars see largest reduction in 2003 vs 2002 CO₂ levels, down 4.7 per cent, following big shift towards diesels and cars built using aluminium.
- Sports car market once again is only segment to post net rise in CO₂ emissions.

CO₂ profile of the UK 2003 new car market, by segment

examples of models in each segment are available on page 14



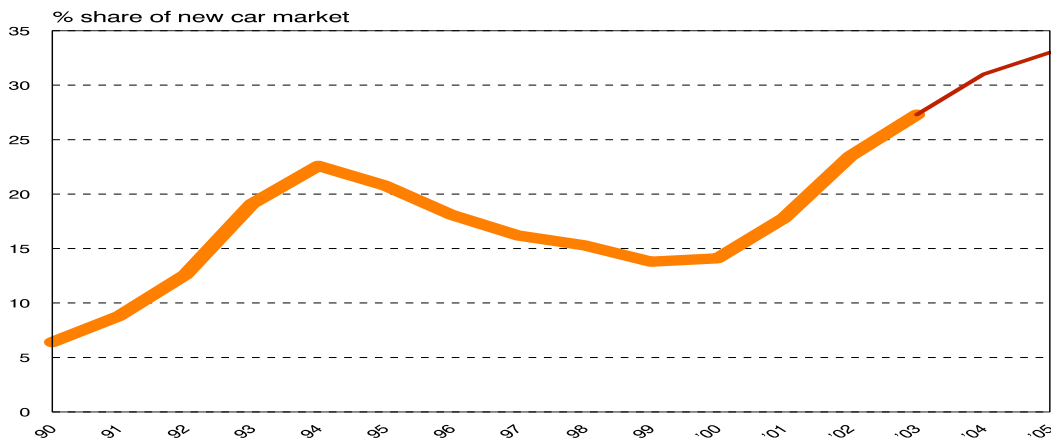
- Between 1997 and 2003 MPVs reported largest reduction in average CO₂ emissions, down 18.0 per cent – almost twice overall market's pace, thanks to downsizing and high diesel content.
- Dual purpose 4x4s, luxury cars and executive cars all seen 10 per cent or more reduction in average CO₂ levels between 1997 and 2003.

New car registrations by market segment

<i>Market Shares (%)</i>	1997	2002	2003
Mini	0.7%	1.6%	1.5%
Supermini	26.5%	32.4%	33.9%
Lower Medium	32.4%	30.1%	27.9%
Upper Medium	25.2%	19.7%	18.6%
Executive	5.8%	4.5%	4.6%
Luxury	0.7%	0.4%	0.5%
Sports	2.9%	2.3%	2.5%
Dual Purpose 4x4	3.8%	5.4%	6.2%
Multi-purpose vehicles	2.0%	3.6%	4.3%

- Superminis now the largest segment, accounting for record 33.9 per cent share in 2003, after further volume growth. Supermini market now over 50 per cent larger than in 1997.
- Niche products, such as MPVs and 4x4s, also saw strong growth in 2003.
- Luxury cars posted biggest rise in 2003, up 32.4 per cent, due to new models.

Diesel new car market



- Diesel market posted fourth successive increase in 2003 to record 704,537 units, up 16.9 per cent, pushing diesel penetration to record 27.3 per cent.
- Wider availability of diesel models, improved performance and specification, tax benefits, better image and greater market push all helped lift the diesel market.
- Outlook is for diesel penetration to continue to rise, reaching 30 per cent by 2004 and possibly 40 per cent by 2008, if government maintains the current tax regime.
- EU diesel penetration remains far higher, at just over 44 per cent.

CO₂ performance by fuel type

- Electric cars have the lowest CO₂ emissions, at zero, but in 2003 just 2 were registered. Petrol/electric hybrids also have very low CO₂ emissions; over a thousand registrations took place in 2003.
- Diesel car CO₂ levels continue to be well below petrol cars – by 6.5 per cent.
- Between 1997 and 2003 diesel cars made a 12.3 per cent reduction in average CO₂ levels, whilst petrol cars achieved an 8.0 per cent decline.
- However, in 2003 average CO₂ value for diesels increased by 1.3 per cent.
- As diesels still have lower CO₂ rating than petrol, net growth in diesels still advantageous for the market's overall performance.

Average CO₂ emissions by different fuel types – volume weighted

Fuel type	1997	1998	1999	2000	2001	2002	2003
Diesel	186.7	183.5	175.8	167.7	164.0	161.7	163.8
Petrol	190.4	189.3	186.5	183.2	180.6	178.1	175.2
Petrol/gas	-	-	-	-	170.3	166.4	166.4
Petrol/elec	-	-	-	107.8	109.1	109.2	113.2
Electric	-	-	-	-	-	0.0	0.0
Market share							
Diesel	16.9%	15.9%	13.8%	14.0%	17.6%	23.5%	27.3%
Petrol	83.1%	84.1%	86.2%	85.9%	82.4%	76.4%	72.6%
Others	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%

For dual fuel vehicles the lower CO₂ figure is used

- Diesel penetration expected to reach 33 per cent by 2005, but still well below current European average of 44.1 per cent reported in 2003.
- If the government's fuel duty policy was more akin to that in the rest of the EU, where diesel duty is lower than on petrol, then diesel penetration in the UK would be higher and average new car CO₂ emissions subsequently lower.
- If diesel penetration equivalent to EU average was found in UK, emission levels would have been some 1.1 per cent lower at 170.2g/km in 2003. If French diesel penetration was found in UK (of 67.4 per cent) then CO₂ levels 2.7 per cent lower at 167.5g/km may have been recorded.

Regional CO₂ performance

Appendix 1 lists the new car market by region, by CO₂ performance. It should be noted that the regional information is based upon where the vehicle is first registered and is therefore influenced by a number of factors (eg where some large companies have their HQs or distribution points as well as levels of wealth and availability of public transport, etc). Using first registration data means that the information is not accurate as to where the vehicle is actually being used.

The data reveals that

- West Glamorgan became the county with lowest average new car CO₂ emissions in 2003, at 163.7g/km, 4.9 per cent below the market average, after a 1.9 per cent fall.
- Northern Ireland, which had the lowest average CO₂ emissions in 2002, slipped into the midfield ranks, after a 2.9 per cent rise in new car CO₂ emissions to 170.9g/km
- Hereford and Worcester made the largest reduction in their 2003 performance, compared with 2002, down 5.1 per cent to 167.7g/km.
- Average CO₂ emissions remain the highest in Surrey, at 182.3g/km in 2003.
- The largest region, Greater London, had average new car CO₂ levels of 179.4g/km, which whilst a 1.4 per cent decline from their 2002 levels were still the third highest. Only Surrey and Warwickshire had higher levels.

Into the future

- There are a host of potential influences on future CO₂ emissions, including standards, regulations, technology, substitution, taxation and incentives.
- Further improvements in emissions are due, as lower CO₂ emitting models arrive, diesel penetration continues to climb, downsizing continues, and government taxation becomes increasingly emission focused.
- Higher diesel penetration or a higher take up of AFVs would help reduce average new car CO₂ levels further.

The table below shows the 10 lowest emitters available in 2003.

Top 10 lowest CO₂ emissions models on UK sale in 2003 (lowest emitter in range)

	Model	Fuel type	CO ₂ g/km
1	Honda Insight	Petrol/Electric	80
2	Toyota Prius	Petrol/Electric	104
3	Citroen C2	Diesel	108
4=	Citroen C3	Diesel	110
4=	Renault Clio	Diesel	110
6=	Peugeot 206	Diesel	113
6=	Toyota Yaris	Diesel	113
6=	Smart	Petrol	113
9=	Daihatsu Charade	Petrol	114
9=	Ford Fiesta	Diesel	114

*Note: Think electric car has zero CO₂ levels, but are not on sale to the general public
Axiam, Ligier and Microcar (circa 80g/km) not included as only type B1 approval.*

- The two lowest CO₂ emitters where both hybrid powered.
- The Honda Insight remains the most efficient car, with just 80g/km – less than half the UK average.
- Axiam, Ligier and Microcar ranges also emit 80g/km of CO₂, but whilst some 585 were registered in 2003 they have a different type approval to mainstream cars.
- Diesels continue to power the majority of cars inside the top ten.
- Just two petrol models feature inside the table; the Smart and Daihatsu Charade.

The table below shows that lower CO₂ emitting alternatives exist in each segment;

Lowest CO₂ emitting models in each market segment in the UK in 2003

Segment	Model	Fuel	CO ₂ g/km	Segm. average CO ₂ g/km
Mini	Smart	Petrol	113	138
Supermini	Citroen C2	Diesel	108	147
Lower medium	Toyota Prius	Petrol/ Electric	104	166
Upper medium	Skoda Octavia/VW Bora/ Seat Toledo	Diesel	138	181
Executive	Audi A6	Diesel	154	211
Luxury Saloon	Mercedes S320	Diesel	204	272
Sports	Honda Insight	Petrol/ Electric	80	222
4x4	Rav4	Petrol	175	244
MPV	Peugeot Partner	Diesel	152	195

- The majority of the most efficient ranges in each segment tend to be diesel or alternative fuelled vehicles.
- If the lowest CO₂ emitting vehicles in each segment were used then average CO₂ emissions would fall by 30 per cent.
- If the market segment shares recorded in 2002 were applied to the 2003 CO₂ values then emissions would be one per cent lower than actually recorded.
- If the average CO₂ values for the segments in 2002 were applied to the 2003 market structure then CO₂ emissions would be 1.7 per cent higher than actually recorded.

Industry commitment to reduce CO₂ emissions

The vehicle industry has made positive steps in reducing CO₂ emissions, and is committed to significant future reductions. In a groundbreaking voluntary agreement in 1998 members of the Association des Constructeurs Europeens d'Automobiles (ACEA) agreed to reduce average new car CO₂ emissions across Europe by 25 per cent from their 1995 levels by 2008 to 140g/km. Members of the Japan Automobile Manufacturers Association (JAMA) and Korea Automobile Manufacturers Association (KAMA) members signed similar agreements in 1999.

There are also interim targets, for ACEA members to reach 165-170g/km by 2003, for JAMA to reach 165-175g/km in 2003 and for KAMA to reach 165-170g/km by 2004.

SMMT has estimated that this measure will result in a saving of 14 million tonnes of CO₂ in the UK alone, equivalent to 3.8 million tonnes of carbon. This will represent over 15 per cent of the UK government's share under the Kyoto commitment.

The European and Japanese car makers' have however rejected suggestions that they alone could achieve average new vehicle CO₂ emissions of 120g/km by 2012. Industry believes such targets would add €4,000 extra per car, or €50bn overall. In terms of carbon emissions abatement costs would be up to €900 per tonne, far higher than in other sectors.

Industry has called for a radical change in tack by the EU to draw in fuel producers and drivers as well as vehicle manufacturers. Blending with biofuels could cut CO₂ by an additional 4%, it calculates. Additional alternative fuels should be considered. Improved traffic management, infrastructure and consumer/driver behaviour "could make a major contribution".

European average new car CO₂ performance

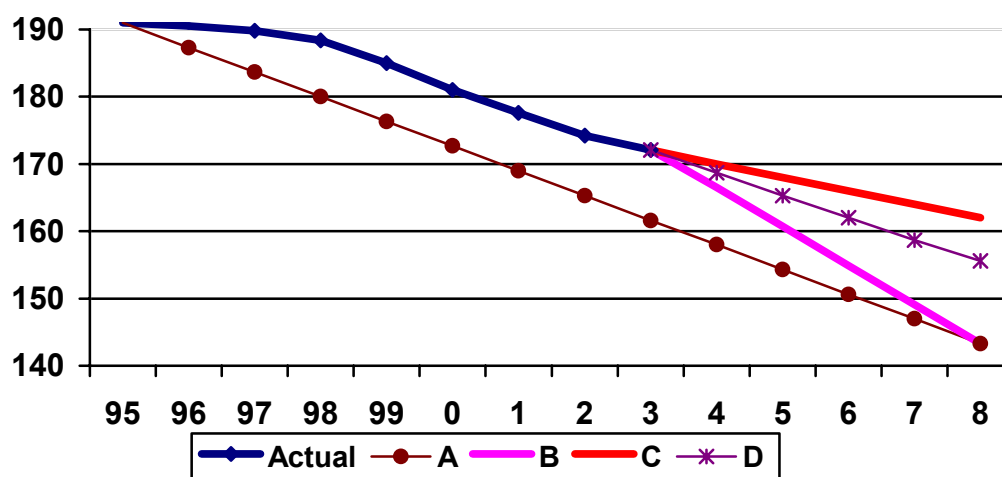
Latest performance in average new car CO₂ emissions across Europe

	2002 CO ₂ /g/km	% change from 1995	Interim target	% p.a need to meet target	Market share %
ACEA	165	10.8%	165-170 by '03	2.5%	86.4%
JAMA	174	11.2%	165-175 by '03	2.8%	11.1%
KAMA	183	7.1%	165-170 by '04	3.4%	2.4%

- Figures for ACEA, JAMA and KAMA members across the EU15 states show good gains from the 1995 base levels, but a pick-up in pace of reductions is still required
- Collectively ACEA, JAMA and KAMA members account for 99 per cent of all cars registered in the EU.
- 2002 was the first time Member States reported performance to the Commission – figures from ACEA members in 2002 were lower, 163g/km vs MSs 165g/km tally.
- ACEA members' own figures show they have made a 12.1 per cent reduction from the 1995 baseline.
- ACEA members reached interim target rate in 2000, now at the lower end of it.
- The member state with the lowest average new car CO₂ emissions in 2002 was Portugal at 152g/km, followed by Spain and Italy.
- Sweden continued to have the highest level, at 198g/km.
- A near 15 per cent further reduction in average CO₂ emissions across Europe is required to meet the 2008 target.
- JAMA members made best progress since 1995, and now inside their interim target
- KAMA members have most work to do to achieve targets.
- Industry remains strongly committed to ambitious challenge of reducing emissions.
- EU seeking to achieve 120g/km by 2010, based on labelling and fiscal measures.

UK performance – outlook scenarios

UK Average new car CO₂ performance 1995 – 2008



The chart above details progress in UK average new car CO₂ emissions made since 1995 and three different scenarios for the future, plus if a flat line reduction was made from 1995 to a 25 per cent reduction by 2008. It should be noted there is no UK target, only the pan European one. In addition, the data used (as in the report as a whole) looks at emissions across the entire UK new car fleet, not merely those produced by ACEA, JAMA or KAMA members.

The chart starts with the 1995 estimate, but data was not compiled by SMMT till 1997. The data shows little change in CO₂ levels between 1995 and 1997.

Scenario A (brown line) is a straight line showing constant g/km reduction per year, taking the figure down 25 per cent by 2008, to 143.3g/km.

Scenario B (pink line) shows straight line reduction from 2003 base to get down to the 25 per cent reduction point by 2008. This requires a near 6g/km per annum saving over the next five years. Between 1995 and 2003 the average annual reduction was 2g/km, between 1997 and 2003 it was 3g/km. Such a pickup in the pace of reductions would require some large steps to be made in reducing CO₂ levels from new technologies and market shift.

Scenario C (red line) continues the 2003 reduction of 1.2 per cent cut in CO₂ levels per annum. This would create a net reduction of 15 per cent from the 1995 baseline to 162g/km, but some 13 per cent off the target figure, having made reductions of just 10g/km over the next five years.

Scenario D (purple and starred line) a reduction of two per cent per annum in CO₂ levels is achieved – more akin to the average savings made over the past 5 years. Such a move would take the average new car CO₂ emissions down to 155.5g/km – some eight per cent off target, but still 19 per cent below the 1995 base level.

In all scenarios the introduction of further controls on regulated emissions will have a negative impact on CO₂ emissions, as they either require fuel to operate or increase demands on the engine.

Achieving a 25 per cent reduction in CO₂ emissions could be achieved through increased diesel penetration, further advances into the market by AFVs and steady reductions across the board in reducing CO₂ levels. A shift to smaller cars – which tend to have lower CO₂ emissions – could also influence the market average.

If the lowest CO₂ emitter in each segment were bought then average emissions would fall by 30 per cent to 120.5g/km – well below the 2008 target. If all 4x4s and MPVs were replaced by superminis then the figure would fall by almost five per cent to 164g/km.

If diesel penetration rose to 50 per cent by 2008, AFVs took a two per cent market share, and there was a steady 3 per cent per annum reductions in CO₂ levels for all fuel types the UK average would get to 145g/km. If diesel penetration was 40 per cent, AFVs achieving a one per cent share and just 1.5 per cent annum reductions in CO₂ levels for all fuel types would get us to 158g/km – down 17 per cent from the 1995 base, but some 10 per cent off the target.

Clearly achieving a 25 per cent reduction from the 1995 baseline in the UK will be extremely tough. It is not an insurmountable challenge though. Diesel penetration has considerable scope to increase and enhanced technologies are being brought to the market place. The next section looks at where savings may come from.

New fuel technologies

There are no easy routes to low carbon vehicles and manufacturers must balance their environmental responsibilities with the sometimes harsh commercial realities that exist in the global automotive markets in which they operate. Vehicles must be introduced to the market that are saleable. It is important that all partners – manufacturers, government, consumers, media and the like – understand and appreciate the balancing act.

Vehicle manufacturers are striving hard to develop and bring to the market successful low carbon products. Already new technologies are in the market place and more are en route.

Conventional fuels, namely petrol and diesel, still offer considerable further scope for reducing CO₂ emissions. The widespread provision of zero sulphur fuel will enable manufacturers to get the best out of new technologies such as direct injection systems. Reducing the weight of the vehicle, improving the recyclability, introducing innovative gearboxes that maximise the efficiency of the engine, and vehicles which switch off their engines whilst sitting in traffic are all high up on manufacturers' development lists and should bring CO₂ savings. At present vehicles meeting Euro 4 emission standards are entering the market place. Planners need to bear in mind future emissions standards (e.g. Euro 5) and its impact on CO₂ levels when creating the appropriate regulations.

Innovative fuels continue to be developed as well. The following table highlights some of the alternative fuel types being viewed and potential introduction dates. SMMT and our members continue to believe that hydrogen shows the greatest ultimate potential, providing it can be made from renewable sources. Hydrogen powered electrolytic fuel cell vehicles are a very promising long-term transport solution. Hydrogen (sourced from liquid or gas form) can be supplied to an on-board fuel cell to produce electric power and emit zero CO₂ emissions from the vehicle. Unfortunately hydrogen vehicles are proving extremely complex and expensive to make and introduce to the market place in a commercial sense.

Possible timetable for introduction of alternative fuels/technologies

(Source SMMT's Future Fuels Study Group 2001)

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15
Bio-fuels (as additive)		From 2003												
Natural Gas (in fleets)			From 2004											
Gas to liquid (as additive)										From 2010				
Petrol hybrids	Running now and likely to increase													
Diesel hybrids		From 2003												
Hydrogen - Fuel Cells				Limited availability							General Availability			
Hydrogen – combustion cells				Limited availability							General Availability			
LPG	Running now but advantages will diminish													
Electric	Running now but future use expected to remain limited													

Other fuels are also being evaluated, and many are already in the market. The most common are gas powered vehicles, using LPG or CNG. They offer air quality and some CO₂ benefits, but are dependent upon Government's fuel duty and incentives programme (especially Powershift).

The industry is also developing and testing vehicles that can exploit bio-fuels. The industry has advised that a blend of up to five per cent of the bio-fuel within the fuel content would be the best way to go, rather than trying to develop cars which run entirely on bio-fuel.

Some electric vehicles have been trialled in the UK market place, whilst petrol/electric hybrid vehicles are now available for sale. This is a major development within the market and one that is giving consumers the choice of purchasing very low CO₂ emitting vehicles.

Consumer confidence in new or novel technologies remains one of the biggest challenges faced by vehicle manufacturers. It would be unrealistic to expect significant shifts by mainstream car buyers to ultra low carbon vehicles until these had been overcome. In the meantime vehicle manufacturers continue to be committed to improving fuel efficiency across the full range of products they offer.

Sales of alternative fuelled vehicles (AFVs)

- Volumes remain relatively low, but growing rapidly.
- Green image, tax incentives and congestion charge exemption is boosting demand.
- Higher price and less advanced infrastructure remains a hindrance to volumes.

MVRIS market data shows that new registrations of AFVs rose by almost 50 per cent in 2003, but at just over 4,000 units volumes remain low – at 0.2 per cent of the market. The MVRIS data shows the first registration of the vehicle, and so any after-market conversions are not reported in this system. The market for LPG gas powered cars is therefore probably considerably understated.

Data for 2003 shows 4,266 alternative fuelled cars were registered, a 49.8 per cent rise over the 2,847 units recorded in 2002 and almost 12 times the 357 registered in 2000. The main growth area has been gas powered vehicles, which accounted for 75 per cent of the 2003 AFV market. Vauxhall is the market leader here, accounting for 79 per cent of the market, mostly through their Astra and Vectra models. Volvo, Ford and Nissan are also represented in the gas-powered vehicle markets. In 2003 a record 1,079 petrol/electric cars were registered – 218 per cent up on the 2002 rate, with the arrival of the new Honda Civic hybrid key to the growth momentum. The Honda Insight and Toyota Prius also compete in this sector of the market. There were just 2 electric Th!nk cars registered in 2003. Much of the volume of these AFVs are made up of councils or companies keen to demonstrate their green credentials. However, exemption from the London congestion charge has also added to interest in AFVs.

AFVs still come at a price premium to purchase. A petrol/electric car costs between £15,000 and £20,000, approximately £5,000 more than a similar sized normally fuelled vehicle, whilst gas fuelled cars can cost up to an additional £2,000. Often the cars are sold at a loss by manufacturers keen to establish a market, or themselves as a market leader. Usually the increased outlay is made up by lower running costs. However, government policy has not been wholly supportive – with the Powershift programme to encourage the take up of AFVs running out of funding and the preferential duty of gas fuel being sharply eroded in 2003.

Low Carbon Vehicle Partnership (LowCVP)

Launched in January 2003, the LowCVP is an action and advisory group that brings together government, industry, environmental and other stakeholder groups to promote the shift to clean low carbon vehicles and fuels in the UK. The partnership is focusing on low carbon buses, R&D, passenger cars, low carbon fuels and supply chains.

The Passenger Car Working Group is considering the targets set out in the *Powering Future Vehicles* strategy (www.roads.dft.gov.uk/cv/power/pdf/strategy.pdf), of which a principal aim is to see 10 per cent of all new cars registered in the UK emitting 100g/km or less of CO₂ by 2012.

The low carbon transport Fuels Working Group is looking into the longer term issues of future fuels, like biofuels and hydrogen, and ways of bringing these fuels to the market place while addressing technology, infrastructure and health and safety issues. The government's Energy White Paper (<http://www.dti.gov.uk/energy/whitepaper/>) provides the policy context for the group.

For further information on the LowCVP the web site address is www.lowcvp.org.uk.

Commercial vehicles

The principal focus of this report is cars. That is subject on which we have CO₂ emission data. Commercial vehicles also play a significant part in the vehicle parc and to society as a whole. There were some 360,000 new CV registrations in the UK in 2003 (versus 2.579mn new cars) and there are just over 3.5 million CVs in use in the UK.

However, no CO₂ emissions data is currently available on CVs. This is because CO₂ emissions data is not included within CV type approval, due to the vast array of different body styles and different pay-loads that CVs can take means that any testing procedure is unlikely to be representative.

It is expected that CO₂ data will soon be necessary for light commercial vehicles (under 3.5 tonnes load capacity). Many LCVs share the same engines and engine technologies as passenger cars, so have benefited from the improvements made.

CVs do have to meet Euro standards, which include environmental standards. LCVs which meet Euro IV standards receive a discount on their VED. Heavy commercial vehicles and buses also get a VED discount if they have a reduced pollution certificate.

CVs do lend themselves to alternative fuel use – as they typically have larger body structures to hold the generally larger fuel tanks of gas powered vehicles or the capacity to house batteries for electric vehicles. Also the issue of performance loss for using alternative fuels compared with the traditional internal combustion engine technology is not such a concern for most CV users. In addition, because they are often run by specialist fleet operators, the vehicles can be re-charged/fuelled and/or maintained more readily than by an individual. Finally, as CVs often cover a greater annual mileage the higher purchase cost of AFVs can be spread over a shorter payback period than for the typical passenger car driver.

UK Parc (vehicles in use) data

- Puts new car registrations in overall vehicles in use context.
- Car parc grows to 29.3mn in 2002, vs with 28.6mn in 2001 and 26.3mn in 1997.
- Parc data also used to show increased use of diesels and low volume of alternative fuelled vehicles, but does raise further questions over reliability of AFV data.
- Cars account for 89 per cent of overall vehicle parc.

SMMT's Motorparc data shows the number of cars in use in the UK. The latest data shows there were 29.32mn cars in use. This is an increase 2.5 per cent or almost 720,000 units from 2001 and the parc was 11.5 per cent larger than in 1997. Cars account for 89 per cent of all (four or more wheeled) vehicles on the road, a figure unchanged in recent years. The total UK parc - including all road-going vehicles - was 34.7mn vehicles in 2002.

New cars - less than one year old - accounted for 9.1 per cent of the car parc. This figure compares with 9.0 per cent in 2001, 8.2 per cent in 2000 and 7.8 per cent in 1995. By 2008 over 70 per cent of the parc will be of cars registered since the voluntary agreements were signed.

Diesel penetration continues to climb swiftly, as the number of new diesel cars entering the parc picks up and relatively few cars are old enough to be scrapped. Diesels accounted for 14.3 per cent of the 2002 parc, up from 13 per cent in 2001, 10 per cent in 1997 and just 2.8 per cent in 1990.

Using DVLA fuel codes a reported 31,860 cars were in use in 2002 using alternative fuels. This is a 20 per cent rise on the 26,555 recorded in 2001. The vast proportion - 98.5 per cent still used gas as their alternative fuel. Of the remainder 80 per cent were electric or petrol/electric. A similar proportion to that of the overall parc - 9.1 per cent - of alternative fuelled cars was reported to be under 1 year old.

Total emissions/Other transport emissions

CO₂ emissions in the UK, Million tonnes Carbon, 1990 – 2020

	'90	'95	'00	'05	'10	'20
Road	30	30	32	35	38	42
All Transport	35	34	35	39	42	47
Non Transport	124	116	113	105	106	110
Total	159	150	148	145	148	157

(source Transport Statistics 2003 – forecasts based on DTI Energy Paper 68)

- CO₂ emissions from road transport between 1997 and 2001 stabilised at 32MtC.
- Road transport accounted for 91 per cent of all transport CO₂ emissions and 21 per cent of total UK CO₂ emissions in 2001.
- Overall the UK's CO₂ emissions fell by 4.5 per cent between 1990 and 2001.
- By 2020 total CO₂ emissions are set to rise to within 1.3 per cent of the 1990 level.
- CO₂ emissions from transport are forecast to grow by almost 20 per cent between 2000 and 2010, a very sharp increase from historical growth rates.

While this report concentrates on CO₂ performance it is noticeable that other emissions from road users have also fallen – most having halved over the past decade. Road transport's share of total emissions have also fallen and in 2001 they accounted for 49% of NO_x emissions, 62% of CO emissions, 32% of VOCs and 21% of PM10s.

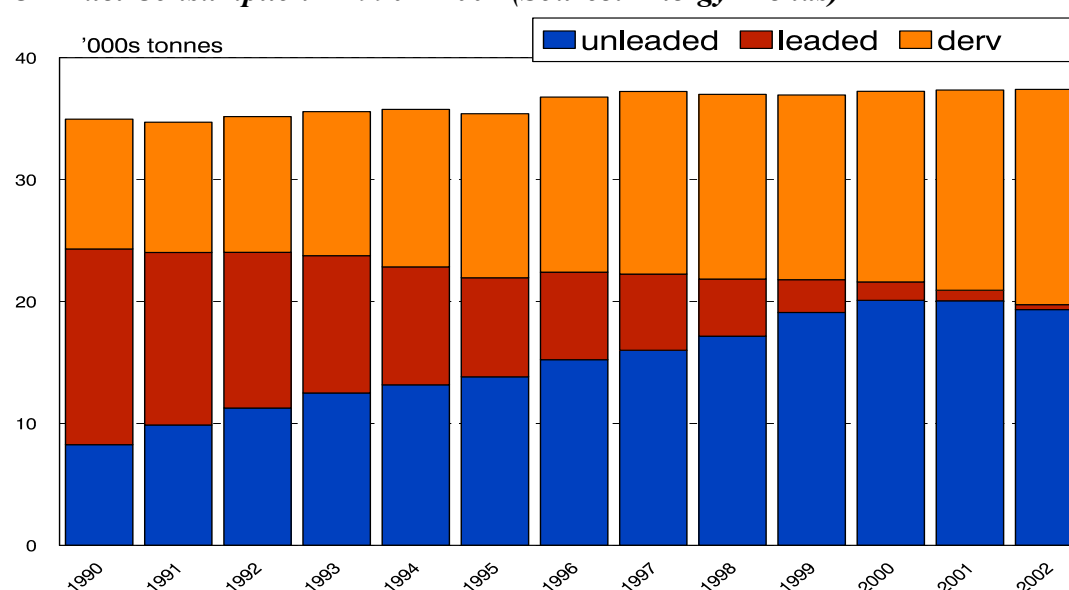
Pollutant emissions in the UK, MtC, 1990 – 2001, by end user (TSGB 2003)

	'90	'95	'97	'98	'99	'00	'01
NO_x – road	1.33	1.10	1.06	1.00	0.95	0.89	0.82
NO_x – total	2.76	2.17	2.01	1.92	1.81	1.74	1.68
CO – road	5.26	4.13	3.76	3.44	3.12	2.67	2.32
CO – total	7.21	5.70	5.28	4.90	4.59	4.03	3.74
VOC – road	1.21	0.87	0.75	0.66	0.58	0.53	0.48
VOC – total	2.69	2.15	2.01	1.87	1.70	1.60	1.51
PM10 – road	0.07	0.05	0.05	0.04	0.04	0.04	0.02
PM10 – total	0.31	0.24	0.21	0.20	0.20	0.18	0.18

Fuel used

The chart below shows that despite a big increase in the volume of vehicles on the roads total fuel consumption has been remarkably constant.

UK Fuel Consumption – 1990 – 2002 (Source: Energy Trends)



- Between 1997 (when this report has CO₂ data from) and 2002 fuel consumption in the UK have been remarkably stable at just over 37 billion tonnes. The total usage increased by just 0.5 per cent over this period.
- Between 1990 and 2002 fuel use has risen just seven per cent.
- There has been a considerable shift towards diesel fuel over this period. In 1990 just 30.5 per cent of deliveries were of diesel fuel, by 2002 that figure had risen to 47.2 per cent.
- Between 2002 and 2001 total fuel use went up 0.1 per cent, for diesels it rose by 7.5 per cent, whilst for petrol it fell by 5.6 per cent.
- Between 2002 and 2001 the vehicle parc rose by 2.7 per cent, with an increase of 14 per cent between 2002 and 1997.
- Road traffic volumes over the 1997 to 2002 period rose by 7.9 per cent.

Conclusions

This third report on average new car CO₂ emissions demonstrates a further improvement in CO₂ levels. The shift in to lower tax groups is even more rapid than the overall UK fleet average. Three per cent of all cars registered in 2003 were sub 120g, compared with virtually none in 1997 and almost 15 per cent of cars in 2003 were under 140g/km, compared with 3.9 per cent in 1997 and 13.6 per cent in 2002.

The report also highlights the reductions made across all other emission levels. The growing number of lower CO₂ emitting vehicles in the parc is also having a positive impact on overall CO₂ emissions and the amount of fuel consumed. Despite a growth in the net volume of vehicles on the roads and an increase in net miles driven emissions and fuel use has remained broadly unchanged since 1997, when CO₂ figures were first collated in this report.

Much of the improvements in recent years have come from the growth in diesel powered vehicles and the shift to superminis. Consumer preferences and their demands have also shifted towards MPVs and 4x4s, which tend to have higher than average CO₂ emissions. However, in those segments too gains have been made through the wider introduction of improved diesels and smaller and lighter vehicles.

The industry still has challenging targets to meet to achieve the pan-European voluntary agreement, yet significant and encouraging progress has been made. Manufacturers are striving to bring ever cleaner more efficient vehicles to the market place, but ultimately it will be a mix of government policy, manufacturer push and consumer preference that determines the future CO₂ profile of the market in 2008 and beyond.

Appendix 1 – Average new car CO₂ emissions by county

	2001	2002	2003	
Avon	176.6	172.7	170.2	-1.4%
Bedfordshire	179.0	176.1	175.5	-0.4%
Berkshire	188.3	182.1	179.1	-1.6%
Border	173.8	172.2	170.8	-0.8%
Buckinghamshire	181.2	178.0	177.8	-0.1%
Cambridgeshire	181.1	175.9	174.1	-1.0%
Central Scotland	173.5	170.6	168.0	-1.5%
Channel Islands	179.8	174.4	168.2	-3.6%
Cheshire	180.7	174.8	172.2	-1.5%
Cleveland	170.5	168.8	167.4	-0.8%
Clwyd	172.3	169.0	168.1	-0.5%
Cornwall	173.4	169.6	169.5	-0.1%
Cumbria	176.6	172.2	169.4	-1.6%
Derbyshire	175.8	174.4	171.5	-1.6%
Devonshire	176.6	173.7	172.8	-0.5%
Dorset	177.5	175.0	174.4	-0.3%
Dumfries and Galloway	173.1	171.2	168.2	-1.8%
Durham	168.5	166.8	165.3	-0.9%
Dyfed	171.3	169.4	167.3	-1.3%
East Sussex	178.9	175.7	174.1	-0.9%
Essex	184.1	181.0	176.2	-2.7%
Fife	171.1	167.4	167.4	0.0%
Gloucestershire	182.1	177.6	177.1	-0.3%
Grampian	177.7	174.1	171.4	-1.5%
Greater London	184.8	181.9	179.4	-1.4%
Greater Manchester	173.5	167.9	166.6	-0.8%
Gwent	173.4	171.0	169.5	-0.9%
Gwynedd	174.4	170.8	170.9	0.1%
Hampshire	179.3	176.5	174.1	-1.4%
Hereford and Worcester	180.9	176.7	167.7	-5.1%
Hertfordshire	180.0	175.9	173.8	-1.2%
Highlands	174.1	171.4	168.6	-1.6%
Humbershire	173.1	169.8	170.5	0.4%
Isle of Man	178.5	174.5	171.8	-1.6%
Isle of Wight	174.3	171.3	170.7	-0.4%
Kent	179.2	177.1	175.3	-1.0%
Lancashire	171.6	169.6	167.3	-1.4%
Leicestershire	174.4	172.6	170.2	-1.4%
Lincolnshire	176.3	174.0	172.9	-0.6%
Lothian	177.9	175.0	172.2	-1.6%
Merseyside	170.3	167.7	166.8	-0.5%
Mid Glamorgan	170.2	167.0	165.8	-0.7%
Norfolk	176.1	174.1	171.8	-1.3%
Northamptonshire	179.2	173.0	172.4	-0.4%
Northern Ireland	169.7	166.1	170.9	2.9%
Northumberland	170.4	169.4	163.8	-3.3%
North Yorkshire	178.4	174.5	168.0	-3.7%
Nottinghamshire	175.1	173.1	172.2	-0.5%
Oxfordshire	182.3	179.9	177.0	-1.6%
Powys	177.5	173.2	173.0	-0.2%
Shropshire	177.5	173.0	172.5	-0.3%
Somerset	177.8	174.4	172.2	-1.2%
South Glamorgan	174.5	172.8	170.8	-1.1%
South Yorkshire	173.0	169.2	167.6	-1.0%
Staffordshire	172.9	172.4	169.8	-1.5%
Strathclyde	170.5	169.2	166.7	-1.5%
Suffolk	177.5	175.8	174.0	-1.0%
Surrey	187.3	180.2	182.3	1.2%
Tayside	173.7	171.4	169.8	-0.9%
Tyne and Wear	167.8	167.0	165.0	-1.2%
Warwickshire	175.5	183.4	181.8	-0.8%
West Glamorgan	170.2	166.9	163.7	-1.9%
West Midlands	178.5	173.2	169.6	-2.1%
West Sussex	178.9	175.9	175.6	-0.2%
West Yorkshire	174.8	170.8	169.0	-1.1%
Wiltshire	174.2	170.8	173.4	1.5%
Total	177.6	174.2	172.1	-1.2%





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