

# NEW CAR CO<sub>2</sub> REPORT 2016

The 15th report



► **The automotive industry in the UK had a strong year in 2015, delivering record volumes of new car registrations and average new car and van carbon dioxide (CO<sub>2</sub>) emissions hit their lowest level ever. Alternatively-fuelled vehicles, including pure and plug-in hybrid electric vehicles, also saw record volumes and market share.**

This 15th annual report continues SMMT's open and transparent approach to the UK industry's performance on new car CO<sub>2</sub>. As always, our reporting uses CO<sub>2</sub> figures from the official New European Driving Cycle (NEDC) laboratory test, which is required by law and witnessed by a government appointed agency. The industry recognises that these figures may not accurately represent real world driving and we welcome moves towards the new World Light vehicle Test Procedure (WLTP), which will help reduce this discrepancy. Given the infinite variables that can influence emissions performance in the real world, laboratory tests will remain a crucial benchmark for consumers to reliably compare the fuel efficiency of vehicles.

The move to this new test procedure will have significant impacts on a range of measures, such as the EU's New Car CO<sub>2</sub> Regulation, CO<sub>2</sub>-based taxes on vehicles and the new car fuel economy showroom label. It will be important to inform consumers on the transition to the new test, to ensure they make full use of the improved information in choosing the best vehicle for their particular needs.

It is important that both CO<sub>2</sub> and air quality issues are addressed with due consideration when policy decisions are being taken. The latest Euro-6 standard, which became mandatory for new cars from September 2015, and new Real Driving Emissions (RDE) tests, due from 2017, will help restore confidence in emissions performance. The tightening of the Euro standards in particular is bringing emissions performance of the latest diesel and petrol engines together. Public policy and measures to reduce emissions further should align CO<sub>2</sub> and air quality ambitions, so other demand for diesels and CO<sub>2</sub> reduction targets are not undermined.

The UK has some of the most ambitious national CO<sub>2</sub> targets in the world and road transport has an important role to play in achieving them. A range of technologies will be needed to meet CO<sub>2</sub> reduction targets with the internal combustion engine (ICE), with both petrol and diesel technologies making a significant contribution. Further electrification of the vehicle fleet is also needed. There has been a strong comprehensive approach to encouraging early adopters to the ultra-low emission vehicle (ULEV) market, but continued incentives and policies are needed to ensure this market grows and will overcome the significant gap between current ULEV uptake and target levels. The uptake of ULEVs will greatly influence achieving the 2021 EU New Car CO<sub>2</sub> Regulation target of 95g/km. It is also important that low emission vehicles are accessible and the technology is cost effective, in order to ensure necessary broad market take-up.

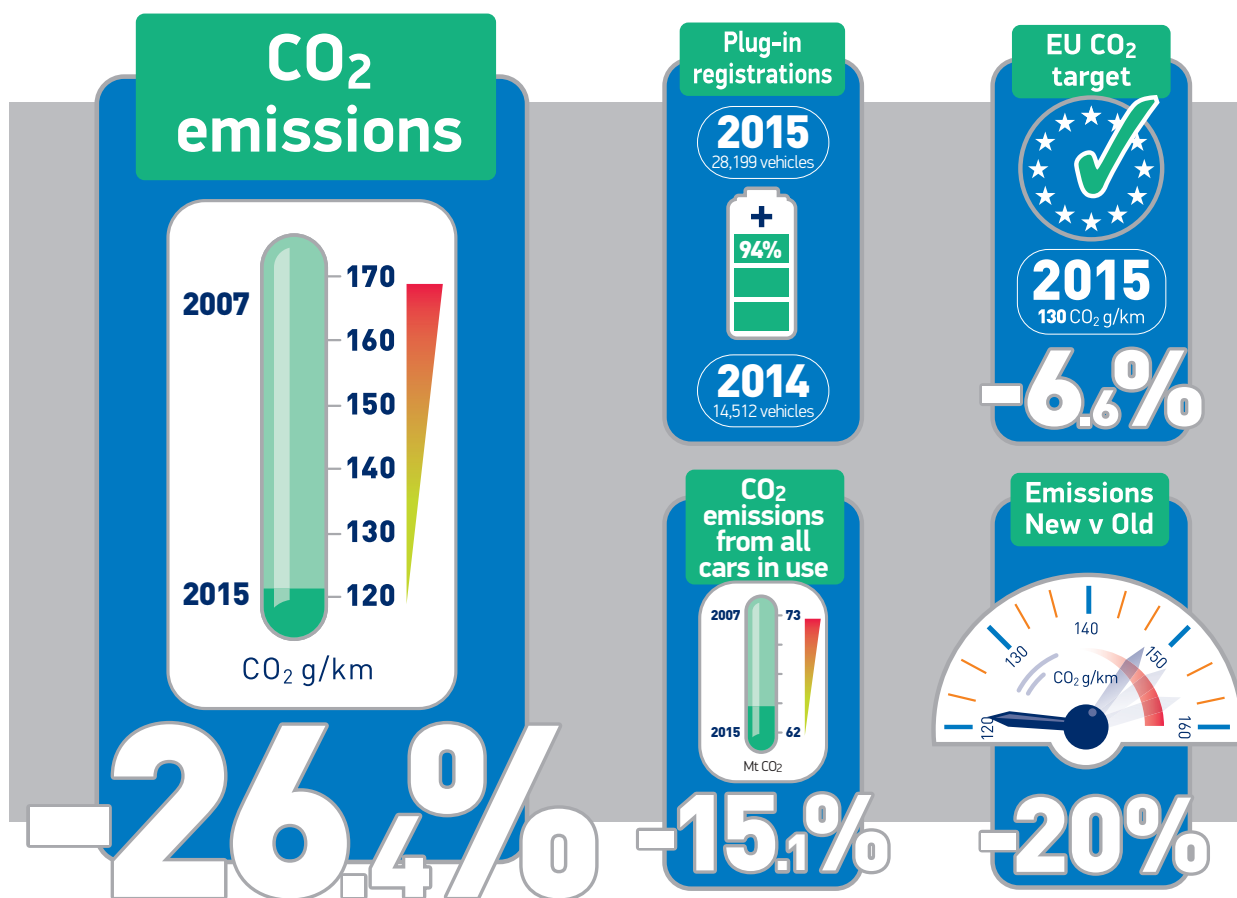
This target requires a significant pick-up in the rate of progress in reducing new car CO<sub>2</sub> emissions. Average new car CO<sub>2</sub> emissions fell by 2.6% in 2015 to 121.4g/km. There has been some suggested discrepancy with the CO<sub>2</sub> performance of around 2,500 registrations of one particular brand, these vehicles are included in the database, but given the low volume, out a 2.63 million unit market, they make no material difference to the overall performance reported. Emissions have fallen every year since SMMT first started producing this report but we must maintain this momentum, delivering ever more efficient vehicles. To note we have typically used 2000 or 2007 as the base year for comparisons, as data from 2000 was for 100% of the new vehicles and 2007 was pre-recession and marked a step change in average new car CO<sub>2</sub> performance.

2016 will be an important year, with, for example, the on-going debate on the move to the new test cycle and development of post-2020 New Car CO<sub>2</sub> Regulations. This report helps set the scene for where the UK market currently is, where it has come from and how we can work collectively with all the key stakeholders, in a comprehensive approach, to deliver further progress. The UK motor industry is best placed to help deliver these objectives, and in doing so secure economic benefits to the UK in terms of jobs and wealth creation. ■

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► The 15th New Car CO<sub>2</sub> Report outlines UK automotive performance relating to CO<sub>2</sub> emissions, market trends and the different development drivers. For more detailed findings and regular updates see [www.smm.co.uk/](http://www.smm.co.uk/)



### 2015 NEW CAR CO<sub>2</sub> EMISSIONS

In 2015 average new car CO<sub>2</sub> emissions in the UK fell to a new low of 121.4g/km, a 26.4% drop on 2007 (pre-recession performance) and a 2.6% reduction on 2014.

### UK NEW CAR EMISSIONS AGAINST EU TARGET

The UK's 2015 performance was 6.6% below the pan-EU 2015 target of 130g/km. However, progression of 4.8% per annum is necessary to achieve the EU's 2021 target of 95g/km.

### PLUG-IN VEHICLE UPTAKE GROWS, BUT NEEDS ON-GOING SUPPORT TO MEET TARGETS

Registrations of pure electric and plug-in hybrid vehicles rose by 94% on 2014 to account for more than 1% of the total market, while the alternatively fuelled vehicle (including hybrids) market share reached a new high of 2.8%. However, there is a significant gap between this and the government's ambition of a 60% share of the market for pure and plug-in electric vehicles by 2030.

### IMPORTANCE OF DIESELS IN MEETING THE CO<sub>2</sub> TARGETS

Diesel cars can emit up to 20% less CO<sub>2</sub> than a petrol car. Therefore any measures that undermine diesel uptake could erode the industry's ability to meet its 2021 95g/km target.

### TOTAL CO<sub>2</sub> EMISSIONS FROM ALL CARS IN USE

CO<sub>2</sub> emissions from all cars in use have been reduced by over 15% since 2007. Emissions have been cut despite the rise in vehicle use and the number of vehicles on the roads. This performance reflects new, lower emitting vehicles entering the market place.

### UPTAKE OF NEW TECHNOLOGIES KEY TO GREENING THE FLEET

New cars are, on average, around 20% lower CO<sub>2</sub> emitting than the average car in use. Speeding up the rate of renewal in the fleet will help lower emissions from all vehicles in use, as well as delivering ever-safer and lower-polluting vehicles. ■

This report continues to use CO<sub>2</sub> figures from the official NEDC laboratory test, which is required by law and witnessed by a government appointed agency. There has been considerable interest in how CO<sub>2</sub> figures are currently derived, given forthcoming changes in the test procedure and differences between test and real world performance. These forthcoming test changes are welcomed by industry to ensure trust and confidence in the data supplied to consumers and other stakeholders.

**TABLE 1 | AVERAGE CO<sub>2</sub> EMISSIONS AND REGISTRATIONS**

CO <sub>2</sub> g/km (sales weighted average)		2000	2007	2014	2015
	<b>Total market*</b>	181.0	164.9	124.6	121.4
	Registrations ('000s)	2,222	2,404	2,476	2,634
<b>BY FUEL TYPE</b>	<b>Diesel</b>	167.7	164.3	124.9	121.5
	Registrations ('000s)	313	967	1,240	1,277
	<b>Petrol</b>	183.2	193.6	126.5	124.2
	Registrations ('000s)	1,908	1,420	1,184	1,284
	<b>AFV</b>	127.3	127.0	75.9	68.2
	Registrations ('000s)	0	17	52	73
<b>BY SALES TYPE**</b>	<b>Private</b>	176.4	165.8	126.3	122.9
	Registrations ('000s)	1,212	1,046	1,179	1,209
	<b>Fleet</b>	175.4	164.0	123.0	119.8
	Registrations ('000s)	1,031	1,195	1,178	1,318
	<b>Business</b>	195.0	165.9	124.5	122.2
	Registrations ('000s)	214	163	119	107
<b>BY SEGMENT</b>	<b>Mini</b>	153.8	128.5	106.7	106.7
	Registrations ('000s)	52	22	84	70
	<b>Supermini</b>	152.9	141.8	114.7	111.8
	Registrations ('000s)	689	771	885	926
	<b>Lower Medium</b>	175.3	158.6	117.4	116.0
	Registrations ('000s)	662	722	647	716
	<b>Upper Medium</b>	192.4	169.1	123.2	121.7
	Registrations ('000s)	477	386	229	249
	<b>Executive</b>	235.6	192.6	134.3	126.0
	Registrations ('000s)	105	104	120	128
	<b>Luxury</b>	292.3	273.8	194.2	191.2
	Registrations ('000s)	11	13	10	9
	<b>Sports</b>	220.5	224.0	170.2	158.0
	Registrations ('000s)	67	66	43	49
	<b>Dual Purpose</b>	259.4	228.3	158.3	147.7
Registrations ('000s)	99	176	292	355	
<b>MPV</b>	211.0	179.7	135.0	131.4	
Registrations ('000s)	60	144	166	131	

\*Data includes total car market, to ensure consistency. Some changes to CO<sub>2</sub> for specific models may result from on-going testing issues, but the exact changes are not known although they are unlikely to have any material impact on the data. \*\*Starts 2001 data.

## GLOSSARY

<b>AFV</b>	Alternative Fuelled Vehicle
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CCT</b>	Company car tax
<b>DfT</b>	Department for Transport
<b>EV</b>	Electric Vehicle
<b>g/km</b>	grams per kilometre
<b>HFCV</b>	Hydrogen Fuel Cell Cars and Vehicles
<b>LCV</b>	Light Commercial Vehicle
<b>MPV</b>	Multi-Purpose Vehicle
<b>OLEV</b>	Office for Low Emission Vehicles
<b>PHEV</b>	Plug-in Hybrid Electric Vehicle
<b>ULEV</b>	Ultra-Low Emission Vehicles (<75g/km CO <sub>2</sub> )
<b>ULEZ</b>	Ultra-Low Emission
<b>VED</b>	Vehicle Excise Duty
<b>WLTP</b>	World Harmonised Light Vehicles Test Procedure
<b>WLTC</b>	World Harmonised Light vehicles Test Cycle

## DEFINITIONS (See SMMT ULEV Guide for full details):

<b>Internal combustion engine (ICE)</b>	<b>Hybrid</b>
Petrol or diesel engine, including those adapted to operate on alternative or gaseous fuels.	Powered by an ICE, but has a battery and electric motors to capture and re-use braking energy.
<b>Battery electric vehicle – or pure EV</b>	<b>Plug-in hybrid electric vehicle (PHEV)</b>
Solely powered by a battery charged from the electricity grid. They have zero emissions from the tailpipe, although some emissions may be associated with the production of the electricity.	Vehicles with a plug-in battery and an ICE.
	<b>Ultra Low Emission Vehicle (ULEV)</b>
	An ultra-low emission vehicle produces 75g/km or less of CO <sub>2</sub> .

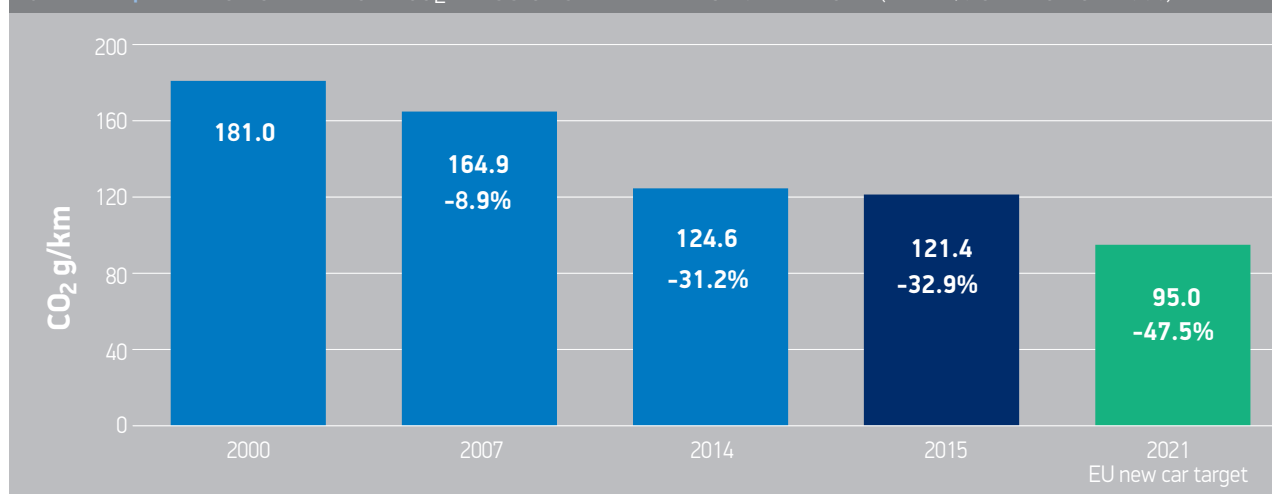
## AVERAGE NEW CAR CO<sub>2</sub> EMISSIONS FALL TO NEW LOW OF 121.4G/KM

UK average new car CO<sub>2</sub> emissions fell once again in 2015, to a new low of 121.4g/km. This was a 2.6% decline on 2014 (124.6g/km), a 32.9% fall on 2000 and a 26.4% decline since 2007. While the rate of progress is on par with the 2.6% averaged since 2000, it does represent a further slowdown on the level reported just after the recession – with the average rate of improvement being 3.9% between 2008 and 2014.

## WHILE 2015 EU TARGET ACHIEVED IN THE UK, 2021 TARGET REQUIRES SIGNIFICANT PICK-UP IN RATE OF PROGRESS

The 2015 UK market performance was 6.6% below the pan EU target of 130g/km. However, to achieve the EU 2021 target of 95g/km in the UK would require the rate of progress to rise to 4.8% per annum. Delivering further gains will become ever more expensive, as lower cost measures have been progressively undertaken. The further significant growth in low-CO<sub>2</sub> emitting alternatively-fuelled vehicles (AFVs), especially electric cars, has contributed to recent progress, but the levelling off and decline in diesel penetration in 2015 and the market shift last year from Supermini to Lower and Upper Medium segment cars appears to have impacted on the recent rate of progress. In addition, the fall in fuel prices and rise in economic prosperity may have also softened consumer appetite for more efficient vehicles

**CHART 1** | AVERAGE UK NEW CAR CO<sub>2</sub> EMISSIONS AND PAN-EU 2021 TARGET (WITH % CHANGE ON 2000)



## MARKET TRENDS MIXED FOR CO<sub>2</sub> PERFORMANCE GAINS

As well as a record low for CO<sub>2</sub> emissions, the 2015 new car market achieved a record 2.63 million unit high for registrations. This 6.3% rise on 2014 marked the fourth successive year of growth and put volumes some 230,000 units or 9.5% above the 2007, pre-recession, market. Private volumes rose by a further 2.5% to more than 1.2 million units, but it was the fleet market which really helped maintain the growth momentum in 2015. AFV registrations grew by 40.7% to represent a record 2.8% of the market, while diesel volumes rose by 2.9% in 2015 – although their share of the market edged back below 50% to 48.5% (**Chart 2**). ■

**CHART 2** | UK NEW CAR REGISTRATIONS AND DIESEL SHARE, 2007 TO DATE



# HOW CO<sub>2</sub> DATA IS DERIVED

## HOW CO<sub>2</sub> DATA IS DERIVED

Forthcoming changes to the test procedure and emissions measurement highlight the focus on how CO<sub>2</sub> data is derived and the differences between test and real world performance. This report continues to use CO<sub>2</sub> figures from the official laboratory test type approval figures, which is required by law and witnessed by a government appointed agency. The data is collated by SMMT's Motor Vehicle Registration Information Service (MVRIS), and links vehicles' CO<sub>2</sub> levels to the MVRIS registration database to give average, sales weighted, data. The total new car market is included in this report, to ensure consistency with previous data. There has been some suggested discrepancies with the CO<sub>2</sub> performance of around 2,500 registrations of one particular brand, these vehicles are included in the data, but given the low volume - out of a 2.63 million unit market, they make no material difference to the overall performance reported.

## TEST PROCEDURE

The CO<sub>2</sub> figure declared on each vehicle's Certificate of Conformity (CoC, the document used to demonstrate the vehicle complies with all the regulations) is derived from the New European Driving Cycle (NEDC) test. This test has its roots in the 1980s and is conducted in a laboratory to enable consumers to make like-for-like comparisons between the CO<sub>2</sub> emissions of different vehicles, rather than as a definitive figure that they would be assured of achieving when driving. The vehicle follows a prescribed driving 'journey', incorporating particular acceleration, constant speed and idling phases. The test is always completed under the same conditions to enable comparability, for example a cold vehicle with ancillary loads such as lights and air conditions turned off is used on a rolling road or dynamometer to ensure flat road and wind-free conditions.

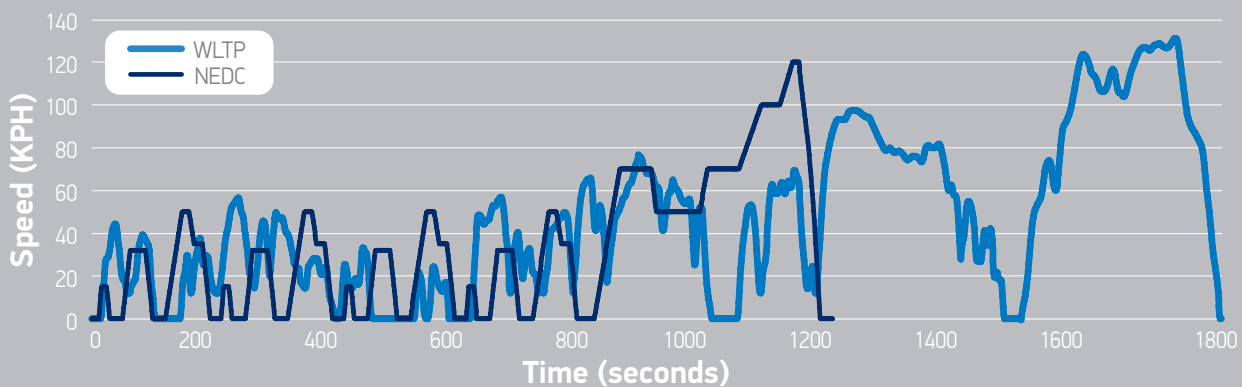
a revised test pattern will replicate more accurately common driving practices. The new test cycle takes almost 50% longer to complete, covers twice the distance and is undertaken at a 46.5% higher average speed than the NEDC (**Chart 3**). The WLTP test is expected to be required for new model types from 1 September 2017 and for all new cars from September 2019.

Driving a vehicle in laboratory conditions and on the road will result in different emissions performances. Real world performance will be influenced by driving style, road and weather conditions, ambient temperatures, location (for example altitude and topology), speed and vehicle condition. It is likely that a discrepancy will continue under WLTP due to these various parameters, as it is difficult for consumers to replicate exactly a vehicle's test performance. The legally required CO<sub>2</sub> data remains fit for comparison purposes, while recognising that experience in the real world may vary.

## IMPLICATIONS FOR CO<sub>2</sub> BASED MEASURES

Understanding the difference between the two cycles will be important for comparing vehicles tested under the different approaches. The WLTP is likely to result in a higher CO<sub>2</sub> figure, given it is a more strenuous test, and may show up to 20% higher CO<sub>2</sub>. Given that the CO<sub>2</sub> performance is used for a variety of measures such as the European New Car CO<sub>2</sub> Regulation, motoring taxes, the new car label (label showing fuel consumption and CO<sub>2</sub> performance that must be displayed alongside a car in showrooms) and consumer information (e.g. advertising and marketing) it will be important to recognise which test has been undertaken, to ensure buyers can make like-for-like comparisons. Until September 2019, when all new cars are required to be tested on WLTP, it is thought that a conversion metric will be established to convert WLTP to NEDC-equivalent figures. ■

CHART 3 | NEDC AND WLTP TEST CYCLES



Limitations in relation to real world performance with the current NEDC test procedure have led to the development of a globally harmonised test procedure – the Worldwide Light vehicle Test Procedure (WLTP). This test will still be carried out under laboratory conditions for comparability purposes, but strict procedures will bring the results closer to real world. For instance, road load or resistance, gear shifts, vehicle weight, tyre type and pressure, fuel quality, ambient temperature and

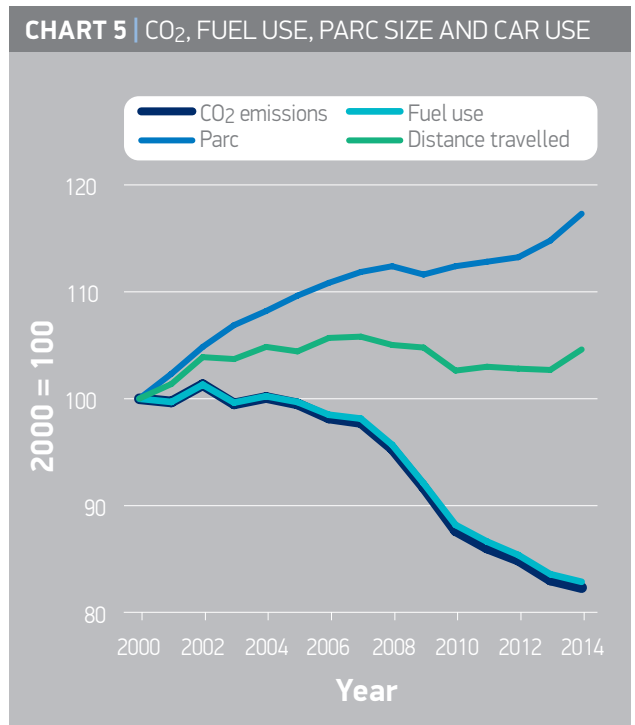
► The 2.6 million new cars on the UK market in 2015 represent only around 8% of the 33 million cars in use – the ‘parc’ (SMMT MotorParc data). However, these new vehicles will be utilising the latest low CO<sub>2</sub> emission technologies. Replacement of old with new models helps clean up the vehicle parc and deliver net reductions in CO<sub>2</sub>. However, increases in vehicle use can undermine this progress. In addition, congestion, vehicle maintenance, driving styles, road conditions, weather and excessive journeys (e.g. from getting lost) can also influence progress in driving down emissions from the parc.

## NEW CAR SOME 20% LOWER CO<sub>2</sub> EMITTING THAN AVERAGE CAR IN USE

In 2014 the average car in use was estimated to emit 156.6g/km of CO<sub>2</sub>, or 20.4% above what a new car emitted. Furthermore, a new car is some 30% more efficient than the average car leaving the parc (at the end of its life, for which the average age is around 12 years). Increased vehicle longevity, as well as the recession, has contributed to the average age of the parc increasing from 6.8 years to 7.8 years in the past decade. While older and classic cars are a strong feature of the UK car parc, measures to help replacement of the fleet and ensure journeys are being undertaken by the newer, more efficient, vehicles, will result in lower average CO<sub>2</sub> emissions, as well as a lower polluting, safer, more reliable and more desirable vehicle stock.

## TOTAL CO<sub>2</sub> EMISSIONS FROM THE CAR PARC ARE FALLING

The latest Government figures show that cars were responsible for 13.3% of all CO<sub>2</sub> emissions in the UK in 2013, at 62.3mtCO<sub>2</sub>e. This share is broadly unchanged since 2007 despite a 15.1% reduction in emissions over that period (17% vs 2000), with a 2.1% drop in 2013 alone. CO<sub>2</sub> emissions from cars have continued to fall since the mid 2000s, with a noticeable



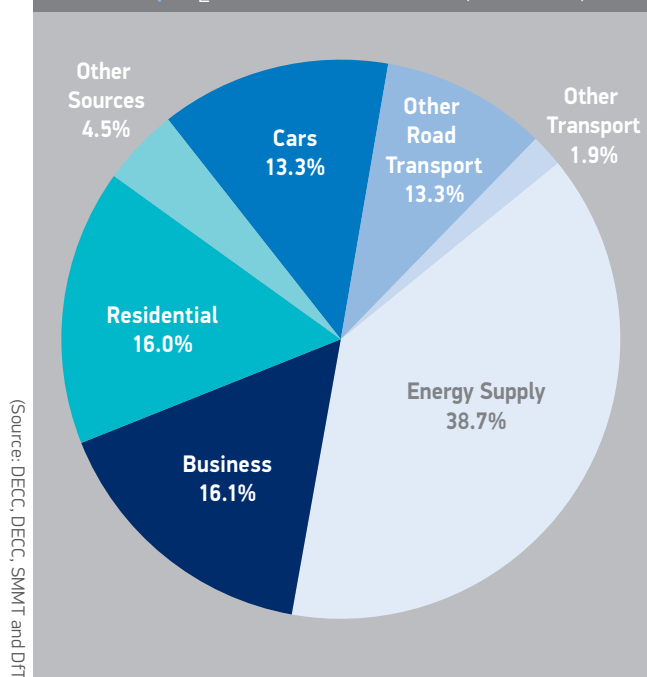
increase in the rate post 2007. This comes despite a rise in the distance travelled and number of vehicles in use. In 2014 emissions (based on fuel use data) are estimated to have fallen 17.7% since 2000, while distance travelled has risen 3.3% (after the recession stymied growth) and parc size rose 17.3%. This also suggests the distance each car is being used is falling, as also evidenced by the National Travel Survey.

## INFLUENCERS OF TOTAL CO<sub>2</sub> EMISSIONS

The comprehensive approach requires for collective action across an array of stakeholders to ensure the best results are achieved at least cost. These include:

- Industry – developing technological progress (more efficient engines, aerodynamics, less energy-draining ancillaries, etc), driver aids (e.g. gear-shift indicators, sat nav) and information
- Consumers – driving the vehicle in the best way (use of eco-driving techniques, using plug-in vehicle performance where available), choosing the right vehicle for the journey, when and where to drive and ensuring vehicle is properly maintained (industry can also help to ensure consumers are better informed)
- Government – taxation used to shape vehicle demand and use, road conditions and traffic information, consumer information, and their own fleet
- Others – for example regulators (e.g. EU’s New Car CO<sub>2</sub> Regulation) and media (e.g. buying advice). ■

**CHART 4 | CO<sub>2</sub> EMISSION BY SOURCE (DECC 2013)**



## OTHER EMISSIONS

### INDUSTRY COMMITTED TO REDUCING CO<sub>2</sub> AND IMPROVING AIR QUALITY IN PARALLEL

Industry and policy makers have been focussed on both CO<sub>2</sub> emission reductions alongside a continued focus on air quality. The automotive sector takes its responsibilities in improving air quality very seriously and has invested billions of pounds in technology to reduce pollutants, notably oxides of nitrogen (NOx) and particulate matter (PM), in parallel with CO<sub>2</sub>. CO<sub>2</sub> is a global issue, but NOx and PM impact at a local and regional level.

These pollutant emissions are regulated by tailpipe 'Euro' standards, which dictate maximum levels that a vehicle can emit. The Euro standard is a pass/fail type test conducted in the laboratory. These pollutants are measured in much smaller volumes than CO<sub>2</sub> in the exhaust gases, so the precision required of the test equipment is much greater. For instance, the NOx limit for Euro-6 diesel is more than 1,500 times smaller than the average new car CO<sub>2</sub> in 2015 (121.4g/km CO<sub>2</sub> vs 0.08g/km NOx).

Ever tougher Euro standards have driven technological development. Public attention has mainly focussed on the performance of diesel vehicles in urban areas. Petrol and diesel car emission levels are broadly aligned with the latest Euro-6 standard. Zero and Ultra-low emission vehicles (ULEVs – below 75g CO<sub>2</sub>/km) can also provide air quality benefits.

### NOx AND PM LEVELS FALLING NATIONALLY, BUT LOCAL AIR QUALITY CONCERNS REMAIN

UK NOx emissions come from three main sources, power stations (30%), road transport (28%) and other combustion, including stationary sources and heating (25%). National figures from Department for Transport (DfT)

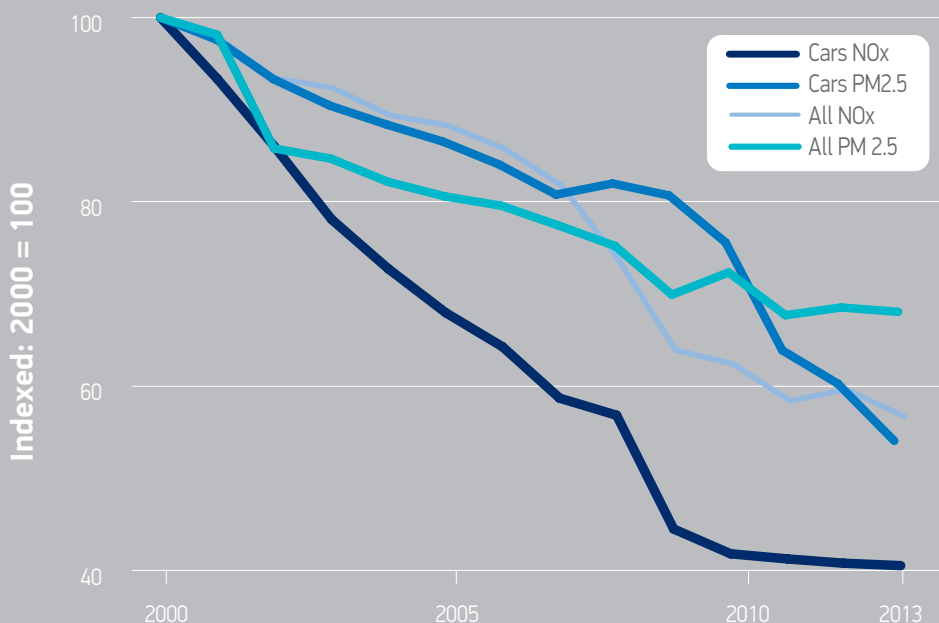
([www.gov.uk/government/statistical-data-sets/env03-pollutants-emissions-and-noise](http://www.gov.uk/government/statistical-data-sets/env03-pollutants-emissions-and-noise)) show cars accounted for 16% of all the UK's NOx emissions in 2013, and that car emissions have fallen by 60% since 2000 compared with a 43% reduction in total NOx emissions. Even in urban areas, significant progress is being made. For instance Transport for London (TfL) modelling illustrates that that NOx from cars will have fallen by 40% by 2020 in central London.

Euro standards and move to real driving emissions limits **Chart 7**, next page, shows NOx levels for diesel cars permitted by the Euro standards (presented by the blue bars). The latest Euro-6 standard, which became mandatory for all cars in September 2015, means cars must deliver emissions levels 84% below the Euro-3 (2000-2004) under the laboratory tests. The recent development of PEMS (Portable emissions measurement system) testing technology will enable the introduction of a Real Driving Emissions (RDE) test on the road alongside the laboratory test.

**Chart 7** also shows the performance of a diesel using PEMS testing equipment undertaken during a study by the International Council on Clean Transport (ICCT). These red bars show that real world performance is above the laboratory test results, but has improved. It is a priority for industry to further improve real world performance and the green bars show what all new cars will have to deliver in the real world for RDE step one from 2017 – a 70% NOx reduction compared with the early Euro-6 PEMS tests, and a 80% reduction by RDE step two.

The exact parameters of the RDE test are still to be finalised, but it is designed to cover a variety of driving styles and on-road conditions (such as temperature and altitude). These tolerances will create a window for the vehicle to operate in, or

CHART 6 | NOx AND PM2.5 EMISSIONS FROM CARS



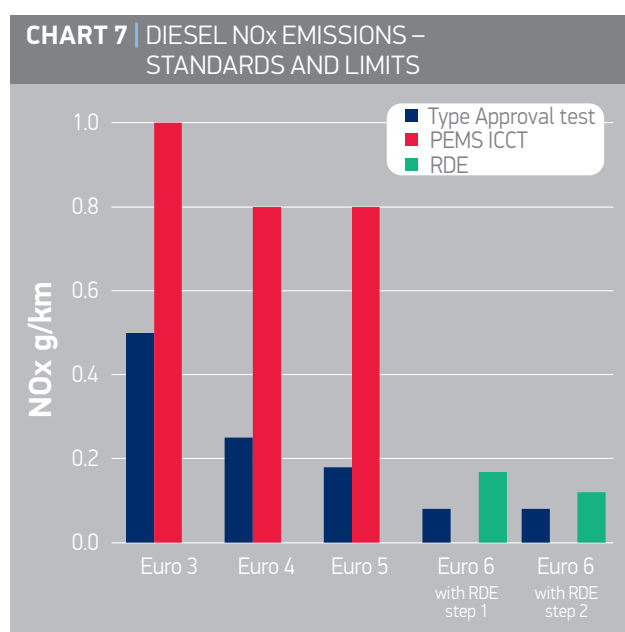
Air quality experts recognise particulate emissions are being addressed, and indeed the UK meets EU limits for particulate matter. Vehicles being produced today feature filters that capture over 99% of particulate emissions, making them the cleanest ever produced. Cars accounted for 5% of PM2.5 in 2013 (3% of PM10), and have recorded a 46% reduction in emissions since 2000, compared with a 32% in total PM2.5 emissions (figures for PM10 were 46% and 31% respectively).

(Chart 6)

(Source: DfT)



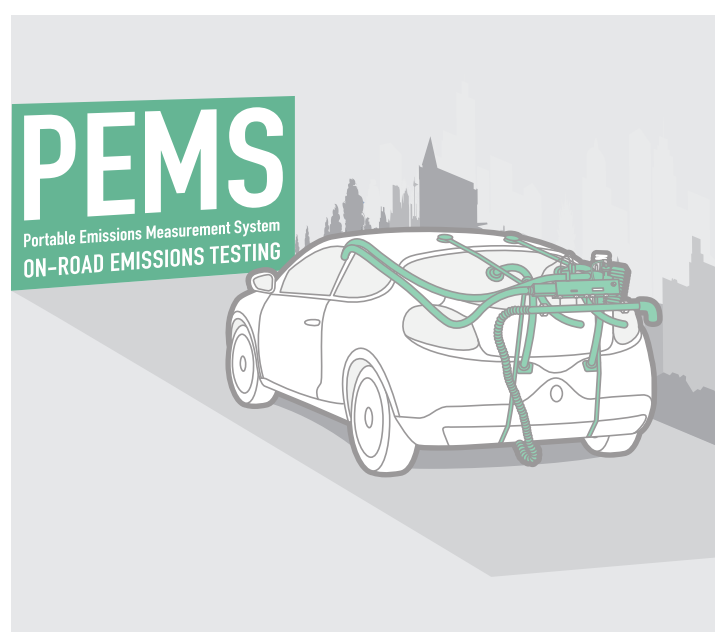
boundary conditions, to allow for the extremes of vehicle use, such as driving up a steep slope, at high altitude, in the cold. In the first step of RDE, to apply from 1 September 2017, a conformity factor of 2.1 times the Euro-6 laboratory test will need to be met, which will tighten to 1.5 in 2020. The factor reflects the margins of error in both the equipment and the testing procedure. This only affects the RDE test, and the Euro-6 limits will remain in place for the laboratory test. In real life, the extreme boundary limits of the RDE test will not be seen very often, if ever. Given the PEMS equipment is still being developed, and the introduction of technologies to meet the tests is on-going, a suitable lead time for the RDE testing is necessary.



The Euro-6 and RDE requirements for new cars will require new technologies to be deployed. For diesels this will likely involve re-design of the exhaust after treatment system. These systems already include diesel particulate filters (DPFs) as standard from Euro-5, exhaust gas recirculation (EGR), selective catalytic reduction (SCR) systems using AdBlue and/or lean NO<sub>x</sub> catalysts (also known as NO<sub>x</sub> storage catalysts, NSC, Lean NO<sub>x</sub> traps, LNT). While some of these solutions are entirely contained in the vehicle and never need additional action by the consumer, SCRs consume AdBlue, a urea based solution injected through a special catalyst, and consumers may need to top up their AdBlue tanks between services. This will require additional infrastructure, for example at petrol stations, and consumer education.

Whilst these pan-European requirements will impact on all cars sold in the EU, air quality typically impacts at a local level. This has given rise to local initiatives being undertaken, for example the London Low and Ultra Low Emission Zones. SMMT welcomes measures such as the framework for Clean Air Zones announced by the Department for the Environment, Food and Rural Affairs (DEFRA) as part of its national level policy framework to avoid a patchwork of different systems confusing road users. Vehicle manufacturers produce vehicles

to meet European, if not global requirements, and a continuity of approach is important to avoid confusing consumers and allow better planning of vehicle choice. Basing standards around Euro-6 emissions criteria, as in the government's Clean Air Zone framework, is appropriate and provides consistency for consumers, operators and industry. Measures that reduce congestion and ensure free-flowing traffic can also help deliver better air quality, as well as reducing CO<sub>2</sub> emissions and saving consumers fuel and money. ■



# MARKET TRENDS AND CO<sub>2</sub> PERFORMANCE

## MARKET MOVING EN MASSE TO LOWER CO<sub>2</sub> EMITTING PRODUCTS

**Chart 8**, below, showing the UK market by selected 5g/km CO<sub>2</sub> bands, illustrates the shift to lower emitting vehicles across the market place. In 2015, 72.0% of the market emitted less than 130g/km – the EU’s 2015 target and 9.2% were 95g/km or below – the 2021 target. This compares with 10.6% and 0% respectively in 2007 and 68.6% and 6.4% in 2014. The rate of progress has particularly stepped up since 2007 as a multiplicity of factors, such as the New Car CO<sub>2</sub> Regulation, technological change – notably arrival of alternatively fuelled vehicles (AFVs) and greater diesel penetration, stricter CO<sub>2</sub> based taxes and information provision, plus the recession have all combined to drive consumers and the market into lower CO<sub>2</sub> emitting vehicles.

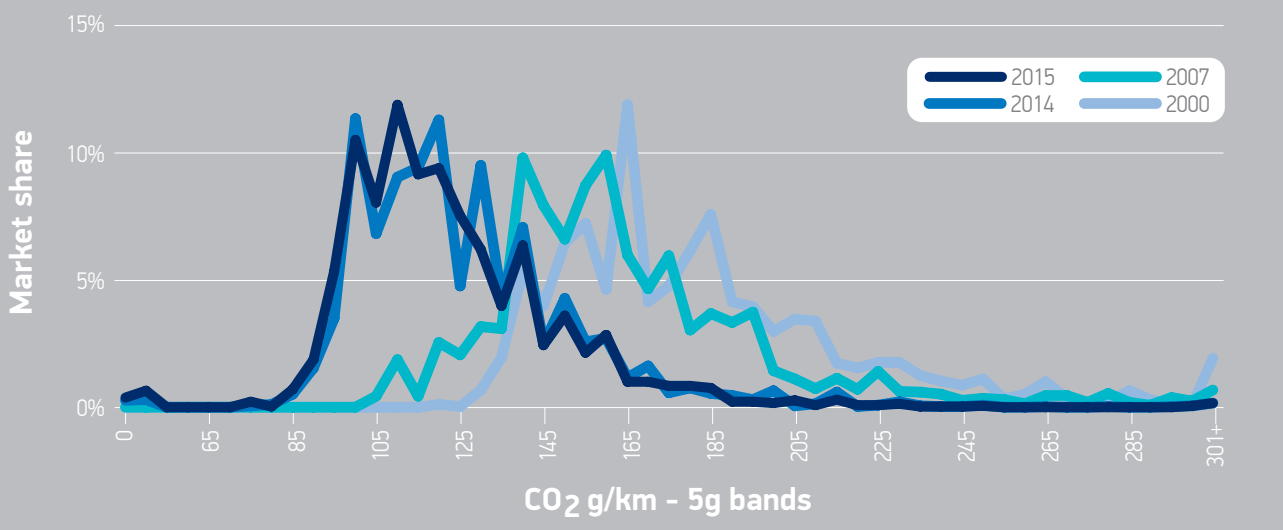
Vehicle type will influence the average CO<sub>2</sub> emissions performance. This section looks at the market primarily by fuel and segment type (SMMT splits the market into nine categories

broadly based on body type and engine size). Sales type – e.g. private or fleet buyer, can also be an influence, although on a sales weighted basis the two are virtually the same (with a maximum variance of some 3% since 2000).

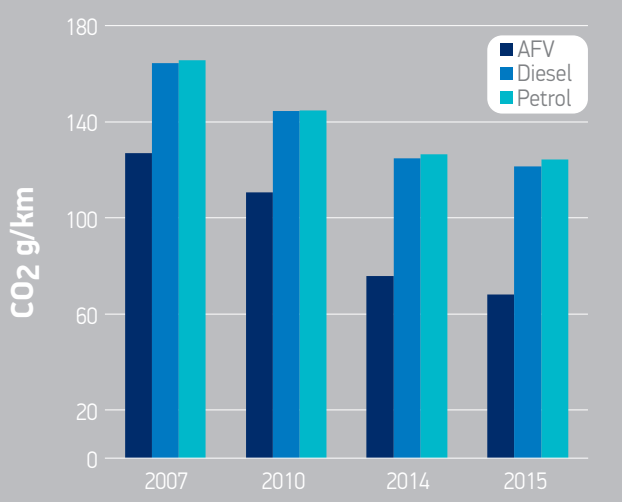
## CO<sub>2</sub> EMISSIONS BY FUEL TYPE

AFVs typically offer lower CO<sub>2</sub> emissions than regular internal combustion engine (ICE) vehicles, which are normally fuelled by diesel or petrol, as evidenced in **Chart 9**. Electric vehicles (EVs – those using battery power) have zero emissions from the tail pipe. Hydrogen-fuelled cars are also zero emitting, using hydrogen to make electricity. Hybrids have both electric power and an ICE, whilst a plug-in hybrid electric vehicle (PHEV) can run on electricity from the national grid and so has zero emission capability. Diesel cars tend to emit up to 20% lower CO<sub>2</sub> than their petrol equivalent, although on a sales weighted basis are more similar due to types of models typically fitted with diesels being larger/heavier. 2015 once again saw an increase in the availability of AFVs, with 65 models recording

**CHART 8 | NEW CAR MARKET BY CO<sub>2</sub> 5G/KM BANDS**



**CHART 9 | CO<sub>2</sub> PERFORMANCE BY FUEL TYPE**

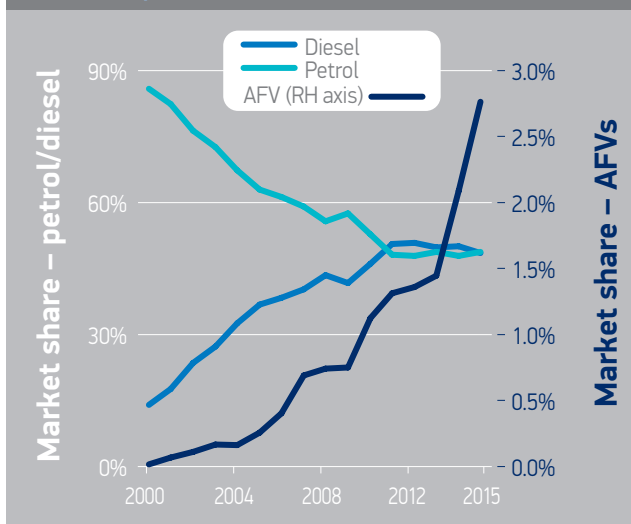


registrations, up from 60 in 2014 and just three in 2007.

On a sales weighted CO<sub>2</sub> performance basis, AFVs emitted 68.2g/km in 2015 – more than 40% below the market average. This was 10% below their 2014 performance and 40% below their 2007 average. This reflects the increased availability and sales of pure EVs and PHEVs, as well as broader technological progress. Pure EVs represented 0.4% of the 2015 market, after registrations rose by 48.3% in 2015 to 9,934 units. 2015’s EV volumes accounted for 80% of the total zero emission car registrations in the past three years and 44% in past 15. Nissan’s Leaf was the best selling EV in 2015, accounting for over half the market. Renault’s Zoe and Tesla also reported strong growth during the year.

**Chart 10** shows how AFV registrations on the whole have performed and the recent ramp up in market share, to 2.8% in 2015. 2015 was also notable for the dip in diesel share. Diesel

**CHART 10 | MARKET SHARE BY FUEL TYPE**

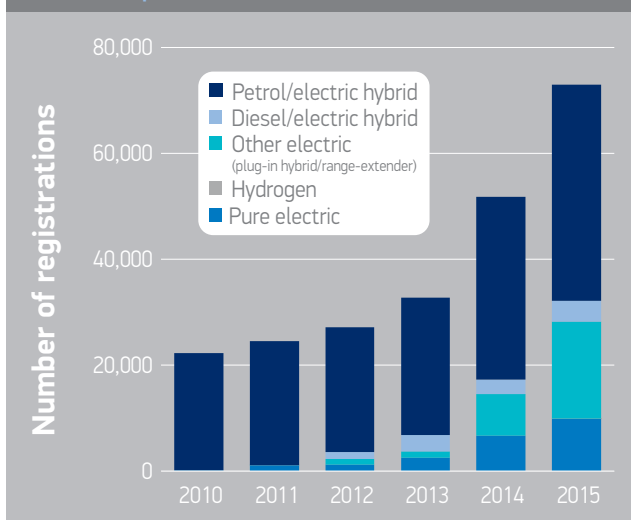


registrations rose by 2.9% in 2015, but were outpaced by the 8.4% rise by petrol powered cars. This resulted in diesel share slipping back below 50%. Diesel volumes came under pressure from growing concerns over air quality and also possibly from movements in fuel prices swinging the balance towards petrol fuelled cars.

Registrations of PHEVs rose by 133% in 2015 to 18,254 units. The Mitsubishi Outlander was the best selling PHEV, with volumes more than doubling to be the best selling AFV of all (outpacing Toyota's Yaris and Auris models). The new VW Golf, Mercedes C Class and increased full year registrations of the Audi A3, BMW i3 and i8 series also boosted the plug-in hybrid sector. Registrations of EVs and PHEVs collectively were up 94% in 2015 to account for 1.1% of the market, up from 0.6% in 2014. Petrol/electric hybrids still dominate the AFV market place (**Chart 11**), and recorded an 18.1% rise in 2015, with Toyota and Lexus models leading the growth. The diesel/electric hybrid market also improved in 2015, up 36.6%.

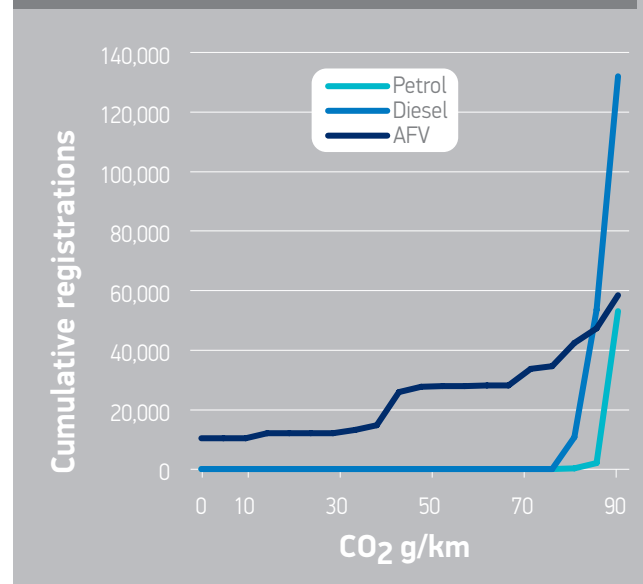
**Chart 12** shows the market for cars with CO<sub>2</sub> emissions below 95g/km. While AFVs account for almost 100% of the market

**CHART 11 | AFV REGISTRATIONS**



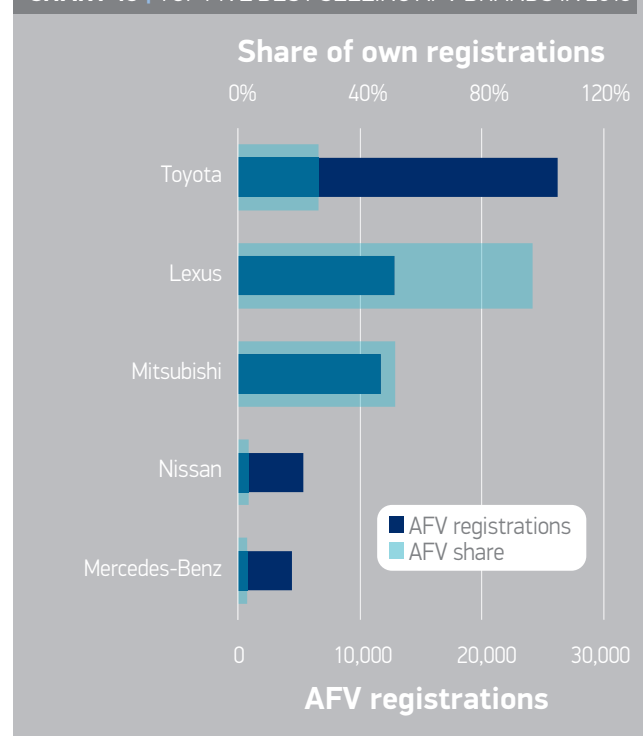
below 80g/km, by the time the 95g/km level is reached AFVs represent only 24% of the market as ICEs pertain at this level. The lowest emitting diesel car in 2015 was the Peugeot 208, at 79g/km, while the lowest emitting petrol car was the Suzuki Celerio at 84g/km.

**CHART 12 | <=95G/KM MARKET BY FUEL TYPE**

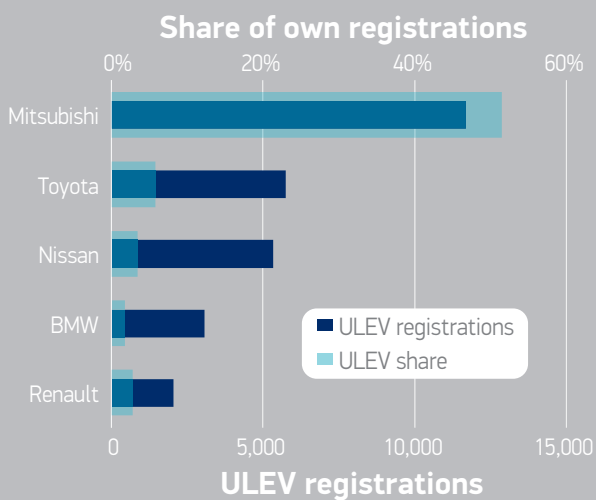


The registrations of top selling brands of AFVs are detailed in **Chart 13**. These five manufacturers represent 83.1% of the AFV market. For Toyota, AFVs accounted for 26.5% of their total new car registrations in 2015, while for Lexus the share was 97% and Mitsubishi over 50%. **Chart 14** (see next page) shows the top five selling ULEV brands. These five brands account for 82.5% of the ULEV market.

**CHART 13 | TOP FIVE BEST SELLING AFV BRANDS IN 2015**



**CHART 14 | TOP FIVE BEST SELLING ULEV BRANDS**



Diesel cars were, on a sales weighted average, 2.2% lower emitting than petrol cars in 2015, although on a like-for-like basis they can be up to 20% lower emitting. Table 2 identifies the best selling model in each segment and shows the lowest diesel and petrol model of each best seller. Although these models may not always have equivalent power (or specifications), the diesels were lower emitting in each case and on average by 18%. The closeness of the average petrol and diesel CO<sub>2</sub> performance reflects diesel engines largely being fitted into larger vehicles. It is notable that in the Mini segment no diesel variants are available given their generally higher cost and larger physical engine size/capacity

requirements compared with petrol-fuelled models. These influences also play out in the Supermini segment, where diesel share was a modest 16.2% in 2015. Diesel penetration was more than 80% in the Upper Medium, Executive and Dual Purpose segments (Chart 16).

### CO<sub>2</sub> PERFORMANCE BY SEGMENT TYPE

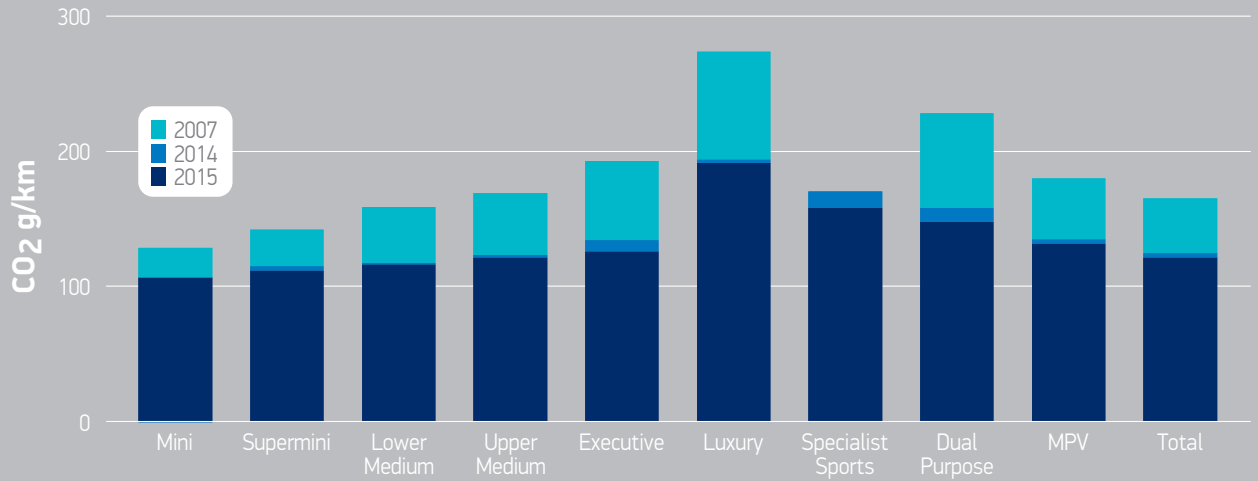
All segments have seen average CO<sub>2</sub> emissions fall by 15% or more since 2007. Over this period, the Executive, Luxury Saloon, Specialist Sports and Dual Purpose segments have seen emissions drop by 30-35%, reflecting their higher starting point for emissions giving them scope for greater percentage gains, dieselisation and also generally higher than average AFV penetration (Chart 16).

The overall progress in new car CO<sub>2</sub> emissions was supported by the growth in the Supermini and Mini segments since 2007, (Chart 17). In 2015, however, these segments lost market share after stronger growth in the Lower Medium and Upper Medium segments – both of which grew by around 10% in volume terms in 2015. The Dual Purpose segment again saw strong growth, up by over 20% in 2015. This shift in vehicle type may reflect the timing of model replacement patterns, but is also reflective of on-going economic growth creating greater confidence amongst consumers to demand larger and higher specification models. The growth in 2015 being focused on the fleet market, which also has a preference for larger cars, may also have influenced market transformation and the easing in the rate of progress in average CO<sub>2</sub> performance. Likewise the drop in fuel prices in 2015 may have diminished consumer demand for high efficiency products. ■

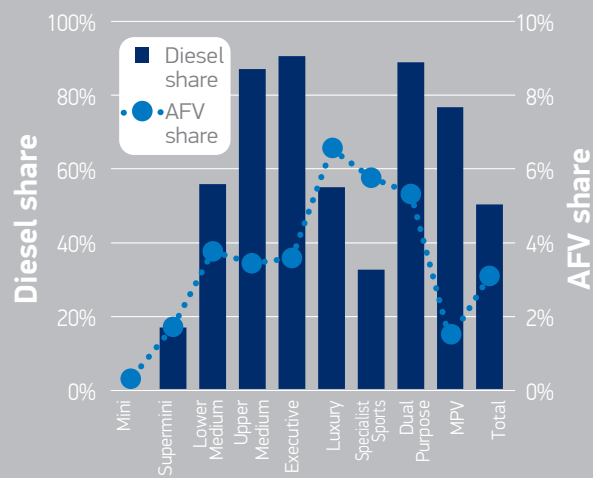
**TABLE 2 | SEGMENT BEST SELLER, 2015, INCLUDING LOWEST DIESEL AND PETROL MODEL'S CO<sub>2</sub> PERFORMANCE**

Market Segment	Model	Registrations in 2015	Lowest diesel CO <sub>2</sub>	Lowest petrol CO <sub>2</sub>	Difference	
<b>A</b>	<b>MINI</b>	HYUNDAI i10	23,846	n/a	98	n/a
<b>B</b>	<b>SUPERMINI</b>	FORD FIESTA	133,434	82	99	-17.2%
<b>C</b>	<b>LOWER MEDIUM</b>	FORD FOCUS	83,816	88	99	-11.1%
<b>D</b>	<b>UPPER MEDIUM</b>	BMW 3 SERIES	36,728	99	122	-18.9%
<b>E</b>	<b>EXECUTIVE</b>	MERCEDES C CLASS	41,821	101	123	-17.9%
<b>F</b>	<b>LUXURY SALOON</b>	MERCEDES S CLASS	3,063	141	199	-29.1%
<b>G</b>	<b>SPECIALIST SPORTS</b>	AUDI TT	9,145	110	137	-19.7%
<b>H</b>	<b>DUAL PURPOSE</b>	FORD KUGA	32,936	122	143	-14.7%
<b>I</b>	<b>MULTI PURPOSE</b>	CITROEN C4 PICASSO	17,599	98	115	-14.8%

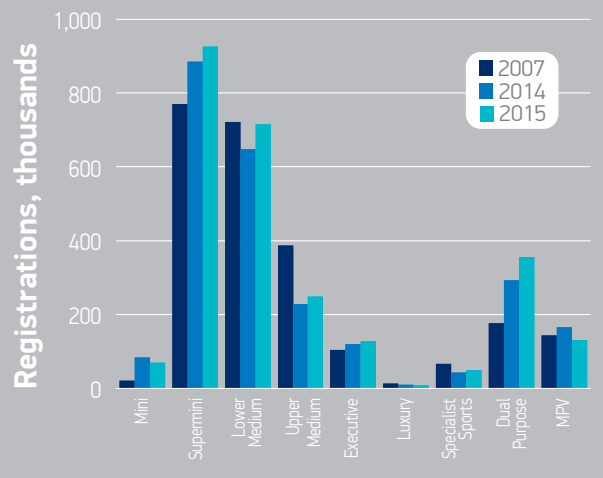
**CHART 15 | CO<sub>2</sub> BY SEGMENT**



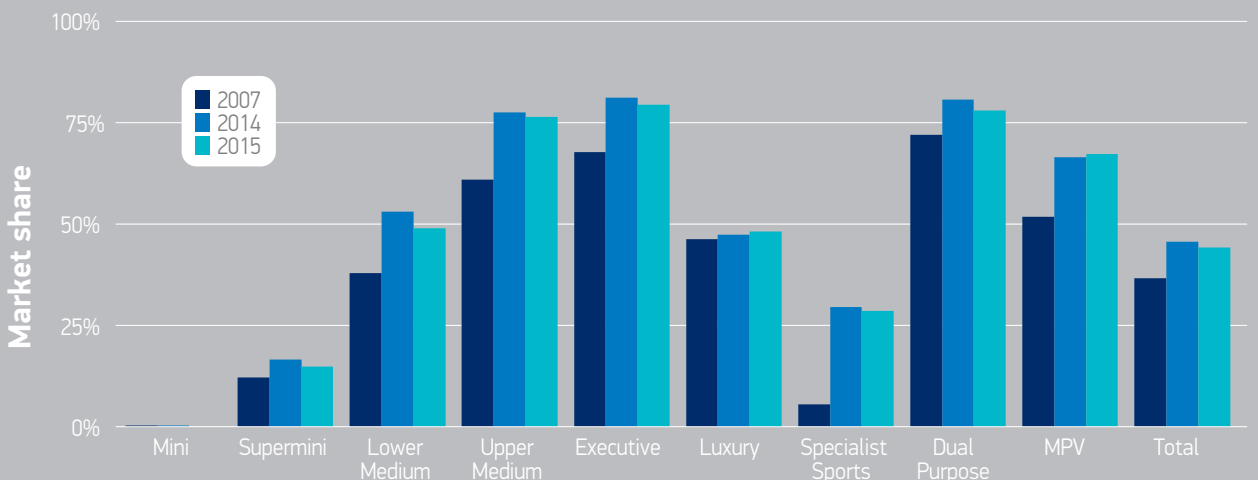
**CHART 16 | DIESEL AND AFV SHARE BY SEGMENT, 2015**



**CHART 17 | REGISTRATIONS BY SEGMENT, 2015**



**CHART 18 | DIESEL PENETRATION BY SEGMENT, 2007 TO 2015**



# CO<sub>2</sub> BASED TAXES AND HOW THESE MAY INFLUENCE EMISSIONS

## ARRAY OF CO<sub>2</sub> BASED TAXES IN PLAY

The UK has a number of tax initiatives in place to encourage consumers to consider lower CO<sub>2</sub> emitting vehicles. Vehicle excise duty (VED), the vehicle circulation tax, has been CO<sub>2</sub> based since 2001, while company car tax (CCT) has been CO<sub>2</sub> based since 2002. Capital allowances are also CO<sub>2</sub> based. The UK has the highest fuel duty in both absolute value and as a proportion of total pump price in Europe, which also acts to encourage fuel efficient motoring. In addition, some local taxes – such as the London congestion charge and some parking permit charges are CO<sub>2</sub> based.

## VEHICLE EXCISE DUTY (VED)

In 2009 VED was broadened out to the current 13 band system and in 2010 a differential first year rate was introduced. The current 2015-16 rates are presented in **Table 3**, below. **Chart 19** shows how the market has shifted into the lower CO<sub>2</sub> bands (highlighted by the movement from blue to green bars in the chart). In 2015 19.8% of the market was in band A, so paid no first year or standard rate, and 72.0% were in bands A-D and so paid nothing in the first year – this is up from 17.7% and 68.6% respectively in 2014, and 0% and 10.6% in 2007. In 2015 the average VED paid in the first year was £59 per vehicle (based on 2015/16 rates applied to 2015 market and with no AFV discount applied), down from £68 in 2014 and less than half the £131 in 2011. Given the amount of cars paying nothing in the first year, those drivers that actually do pay anything, paid on average £210 in 2015, on par with that paid each year between 2010 and 2014.

In Summer Budget 2015, the government announced changes to the VED, redistributing the 13 CO<sub>2</sub> bands and introducing different rates from April 2017 – these are also presented in Table 3. These changes threaten the ability of industry and government to meet national carbon budgets and undermine the industry's ability to achieve the 95g/km pan EU target, in particular by reducing the incentives for low and ultra-low emission vehicles (ULEVs). SMMT believes this sends an important and damaging signal to the marketplace. In addition, the standard rate of VED moving from a sliding scale based on CO<sub>2</sub> emissions to a flat rate of £140 for all non-EVs removes the signal to opt for an ULEV and there is no incentive for the used car buyers to consider lower emitting vehicles. Further, the introduction of a £310 surcharge for five years for cars with a showroom price of more than £40,000 will curb demand for some of the innovative lowest emitting vehicles, such as hydrogen vehicles, as well as being administratively complex. It will also have a detrimental impact on some of the UK's premium, luxury and specialist car manufacturers. To note, if the 2017 rates were applied to the 2015 market then the average vehicle would be subject to a £217 cost, over three and half times more than the average £59 cost they actually paid in 2015.

## COMPANY CAR TAX (CCT)

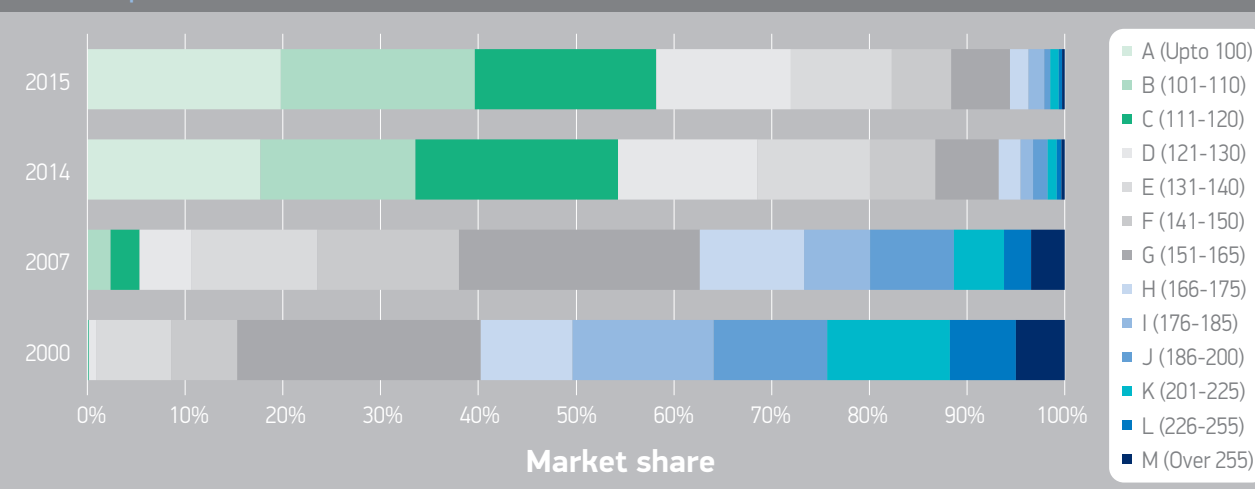
CCT plays an important role in the fleet purchaser's decision making process when choosing a new company car. Running costs are already extremely important to business and CCT focuses the user's attention on their own personal costs. In 2010, government made the welcome move to ensure zero CO<sub>2</sub>

**TABLE 3 | CURRENT AND PROPOSED VED BANDS AND RATES**

Band	Current band 2015 (CO <sub>2</sub> g/km)	Current 1st year/ standard rate*	2015 market share	Proposed 2017 band (CO <sub>2</sub> g/km)	Proposed 1st year/ standard rate	2015 market share
A	Up to 100	£0 / £0	19.8%	0	£0 / £0	0.4%
B	101-110	£0 / £20	19.9%	1-50	£10 / £140	0.7%
C	111-120	£0 / £30	18.5%	51-75	£25 / £140	0.2%
D	121-130	£0 / £110	13.7%	76-90	£100 / £140	2.6%
E	131-140	£130 / £130	10.4%	91-100	£120 / £140	15.9%
F	141-150	£145 / £145	6.1%	101-110	£140 / £140	19.9%
G	151-165	£180 / £180	6.0%	111-130	£160 / £140	32.3%
H	166-175	£295 / £205	1.9%	131-150	£200 / £140	16.4%
I	176-185	£350 / £225	1.6%	151-170	£500 / £140	7.0%
J	186-200	£490 / £265	0.6%	171-190	£800 / £140	2.7%
K	201-225	£640 / £290	0.9%	191-225	£1,200 / £140	1.3%
L	226-255	£870 / £490	0.3%	226-255	£1,700 / £140	0.3%
M	Over 255	£1,100 / £505	0.3%	Over 255	£2,000 / £140	0.3%

\* AFVs pay £10 less

**CHART 19 | NEW CAR MARKET BY VED BANDS**



emitting cars are subject to a 0% rate for five years. However, the incentives have diminished and in 2015/16 zero emitters face a 5% rate of the car list price as basis for CCT, which will rise to 16% by 2019-20, with corresponding rate rises for higher emitting vehicles, as shown in **Table 4**. SMMT believes CCT should continue to incentivise ULEVs, as fleets make up a large proportion of the new car market. In the 2015 Spending Review the government also reversed its previous decision to remove the 3% diesel surcharge in 2016, and so diesel car users will continue to face a steeper CCT level than petrol cars.

### CAPITAL ALLOWANCES (CA)

Capital allowances (CA) are a cost relief for business investment against taxable profits and have been referenced against a car's CO<sub>2</sub> emissions since 2009, with a change in 2013. They are a valuable incentive to persuade fleet buyers to consider ULEVs. A 100% first year allowance is available if the car emits 95g/km CO<sub>2</sub> or below, then 18% if CO<sub>2</sub> emissions are between 96-130g/km and

8% for those over 130/km. In 2018 the rates are due to change, with the 95g/km threshold to be cut to 75g/km.

### THE PLUG-IN CAR GRANT (PICG)

To encourage the take-up of pure electric, plug-in or hydrogen vehicles, the government introduced the PiCG scheme to tackle one of the biggest barriers for consumers, the initial high cost of these emerging technologies. Since 1 January 2011 government has given an incentive of 35% - up to £5,000, off the full purchase price (list, plus VED and VAT) of a vehicle that qualifies (see [www.gov.uk/plug-in-car-van-grants/eligibility](http://www.gov.uk/plug-in-car-van-grants/eligibility)). By the end of 2015 some 25,000 cars have been bought through the scheme. In 2015 the government announced the grant would continue until at least the end of March 2018, although from 1 March 2016 the incentive will be lower (£4,500 for vehicles with CO<sub>2</sub> emissions of less than 50g/km and a zero emission range of at least 70 miles, or £2,500 for those lower zero emission range or CO<sub>2</sub> to 75g/km – those eligible for the £2,500 incentive would also need a list price below £60,000).

**TABLE 4 | CCT REGIME 2013 TO 2019 (SOURCE: BUDGET STATEMENTS TO MARCH 2015)**

CO <sub>2</sub> bands (g/km)	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
0	0%	5%	7%	9%	13%	16%
<=50	5%	5%	7%	9%	13%	16%
51-75	5%	9%	13%	15%	16%	19%
76-94	11%	13%	17%	17%	19%	22%
95-99	12%	14%	18%	18%	20%	23%
100-104	13%	15%	19%	19%	21%	24%

Then 1% rise for each 5g/km band to 37% (35% in 2014-15)

## GO ULTRA LOW (GUL)

Government and several vehicle manufacturers have also set up the GUL campaign to promote ULEVs that can also deliver a minimum of 10 miles of zero-emissions driving. In 2015 Mitsubishi joined Audi, BMW, Nissan, Renault, Toyota and VW as a GUL partner. Kia also joined in 2016. GUL has an informative website ([www.goultralow.com](http://www.goultralow.com)) and undertakes media campaigns to encourage market transformation.

## LONDON CONGESTION CHARGE (CC)

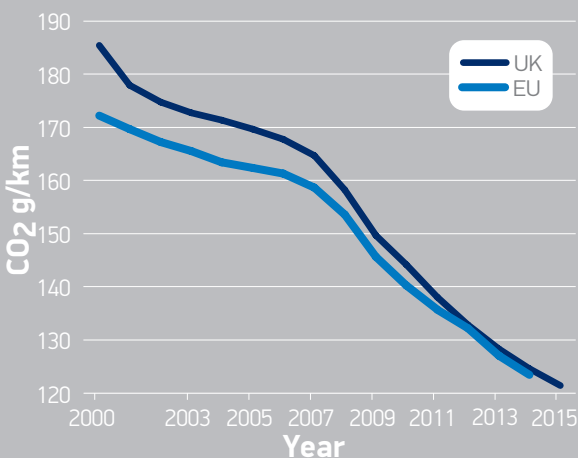
Numerous local measures may also be in place to encourage lower emitting cars, such as parking permits or work-place parking measures, government or local authority buying standards. Probably the most well known is the London CC. ULEVs, vehicles emitting <75g/km of CO<sub>2</sub>, are exempt from the £11.50 per day charge.

## UK APPROACHES EU AVERAGE NEW CAR CO<sub>2</sub> EMISSIONS, AFTER BETTERING RATE OF PROGRESS AGAIN

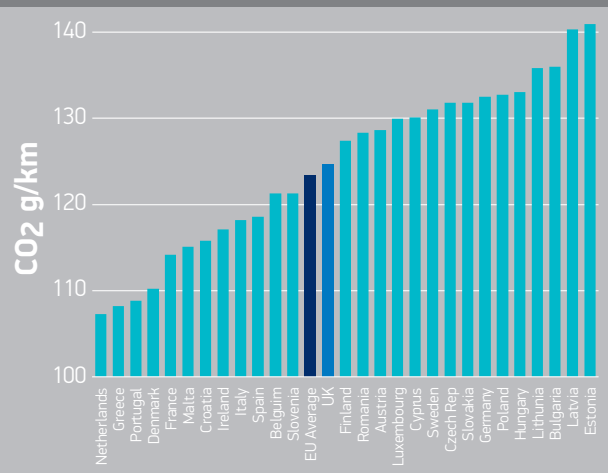
The UK once again outpaced the rate of improvement in the EU in 2014 (latest figures, source: European Environment Agency). Average new car emissions in the EU fell by 2.8% in 2014 to 123.4g/km, compared with the 2.9% drop in the UK to 124.6g/km. The UK was within 1% of the EU average in 2014, compared with 7.7% in 2000.

The UK's higher average emissions are the result of the different market structure to other nations, reflecting higher than average GDP per head and so higher demand for larger and more powerful vehicles, as well as tax measures resulting in lower diesel penetration in the UK. The UK does, however, boast the second largest new electric vehicle market in Europe in 2015, after a 97% rise in volumes (source ACEA, [www.acea.be](http://www.acea.be)). The UK was 13th of 28 in 2014, with the range depicted in **Chart 21**. The Netherlands (107.3g/km) had the lowest average new car CO<sub>2</sub> emissions for a second successive year, after remarkable progress since 2007, when it was 17th of 27 nations. This followed the introduction of CO<sub>2</sub> based taxes and large incentives for electrically powered vehicles, which saw the Netherlands have the largest market for EVs for a second

**CHART 20 | UK VS EU NEW CAR CO<sub>2</sub> PERFORMANCE**



**CHART 21 | AVERAGE NEW CAR CO<sub>2</sub>, BY COUNTRY, 2014**



successive year in 2015, following a 193% rise in volumes. The EU's biggest market, Germany, had average new CO<sub>2</sub> emissions 6.3% above the UK's, at 132.5g/km.

## BALANCING CO<sub>2</sub> AND AIR QUALITY MEASURES

Encouraging transformation of the market to lower CO<sub>2</sub> emitting vehicles has been a key public policy focus and industry priority for several years. Alongside this objective, regulation through Euro standards has driven air quality improvements. It is important that policy and measures be designed to ensure both CO<sub>2</sub> and air quality ambitions are considered and adverse impacts on either are avoided. Industry has spent billions transforming diesel engine emissions technology. New diesels are vastly improved and approaching parity to petrol on emissions that affect air quality under the latest Euro-6 standards.

Diesel vehicles have played an important role in reducing average new car CO<sub>2</sub> emissions, with emissions up to 20% lower than an equivalent power petrol car. Achieving the 95g/km target will continue to rely on diesel technologies, given the majority of the market will still be traditional ICE engined cars by 2021. Any measures therefore that penalise diesel cars could undermine achieving future emission targets. SMMT always looks for a technology neutral approach towards incentives and penalties to encourage the uptake of the latest technologies. SMMT also opposes local measures which could undermine diesel vehicles and send confusing and conflicting messages to consumers. We would also note that the UK has a strong track record in producing diesel engines, and measures which undermine this important section of the market could have a detrimental impact on the UK's wider economic performance.

The market for diesel cars grew in 2015, although market share slipped back for the first time in three years. While the shift to AFVs may have contributed towards this, they did not reflect the overall loss of market share. It remains to be seen if this represents a natural fluctuation in market demand or part of a larger shift away from diesels which may undermine achieving the CO<sub>2</sub> reductions required ahead. ■

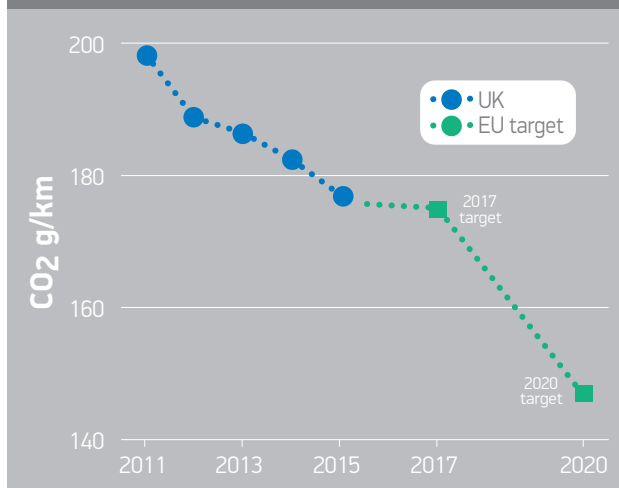


# LIGHT COMMERCIAL VEHICLE (LCV TO 3.5 TONNES) CO<sub>2</sub> PERFORMANCE

## AVERAGE NEW LCV CO<sub>2</sub> EMISSIONS DOWN 3.0% TO 177.0G/KM

Average new LCV CO<sub>2</sub> emissions fell to a new low of 177.0g/km in 2015, down 3.0% on 2014 and, after a pick-up in the rate of progress, was also 10.8% below the 2011 estimate of 198.4g/km (SMMT's first data estimate). **Chart 22** shows the UK's performance since 2011, and also the pan EU New Van CO<sub>2</sub> Regulation targets for 2017 and 2020. The UK's performance was almost down to the 175g/km 2017 target, but still requires a 3.7% per annum rate of improvement to get to the 147g/km target of 2020.

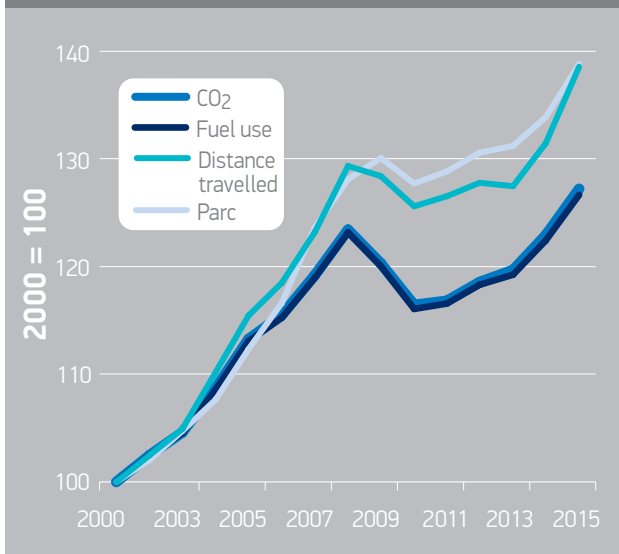
**CHART 22 | NEW UK LCV AVERAGE CO<sub>2</sub> EMISSIONS AND EU TARGETS**



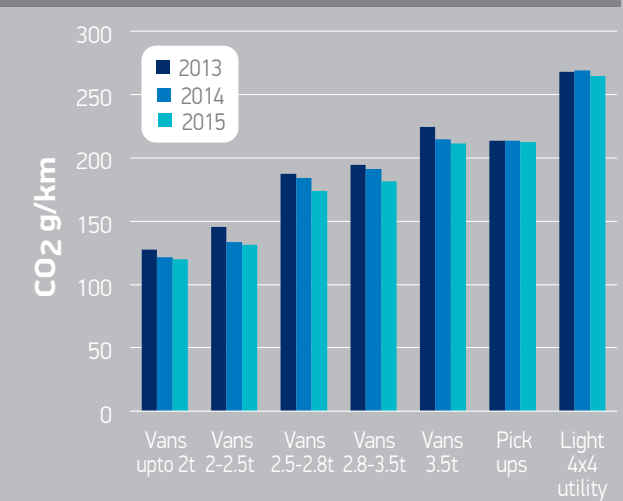
## INCREASED VAN USE RESULTING IN RISE IN TOTAL CO<sub>2</sub> EMISSIONS FROM ALL VANS IN USE

Rapid growth in the new van market has been fuelled by increased home delivery services, general economic growth and downsizing from heavier truck markets. As **Chart 23** shows, the growth in total CO<sub>2</sub> emissions from vans has also increased since 2000, to 16mtCO<sub>2</sub> in 2014, although at 22.9% this is below the rate of growth in vehicle use, as well as the total number of vehicles on the roads (the parc).

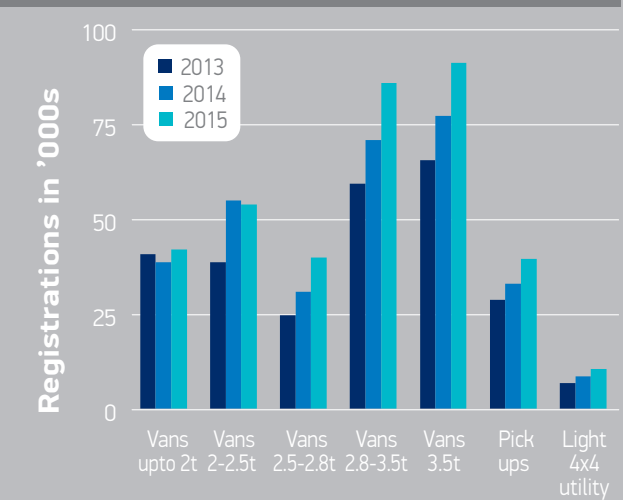
**CHART 23 | TOTAL LCV CO<sub>2</sub> EMISSIONS**



**CHART 24 | LCV CO<sub>2</sub> PERFORMANCE BY SEGMENT**



**CHART 25 | LCV NEW REGISTRATIONS BY SEGMENT**

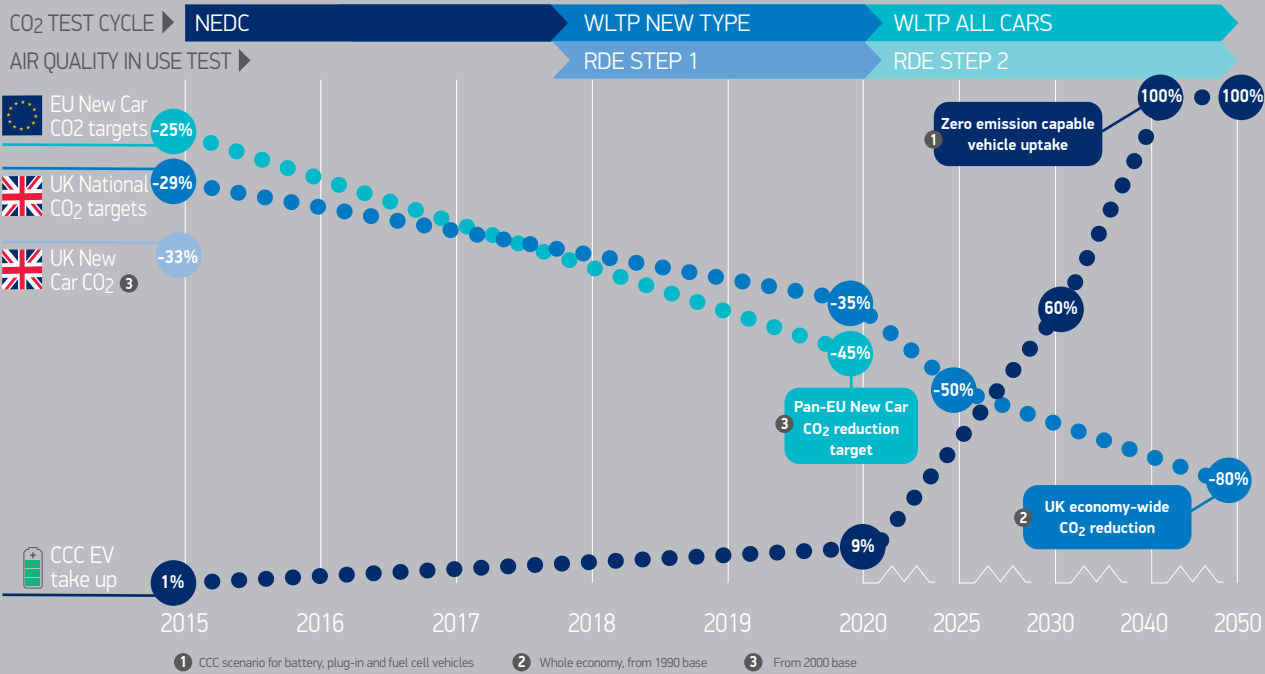


## MARKET SHIFT TO LARGER VANS CONTINUES

Vans, unlike cars, are solely bought by businesses and as such buyers are already focused on minimising operating costs. However, as vans are functional vehicles, bought to undertake a certain work function, their size and payload will be very important to the user. Typically the larger the van the higher the CO<sub>2</sub> emissions, although on a per tonne transported basis the performance may be very different. **Chart 24** shows CO<sub>2</sub> performance by LCV type, while **Chart 25** shows the market shift to larger vehicles, notably 2.8 tonne plus. ■

# OUTLOOK FOR NEW CAR CO<sub>2</sub> EMISSIONS

**FIGURE 1 | OUTLOOK FOR TOTAL UK CO<sub>2</sub>, EV UPTAKE AND REGULATORY CHANGES**



## UK HAS LEGALLY BINDING NATIONAL CO<sub>2</sub> TARGETS – 80% REDUCTION BY 2050

The UK's Climate Change Act binds the government to reduce national CO<sub>2</sub> emissions by 80% by 2050, from a 1990 basis. The Committee on Climate Change (CCC) develops five-year carbon budgets, which UK government then agrees and gives legal force. The first carbon budget (2008-12) was met and by 2014 emissions were 36% below 1990 levels. Therefore we are on track to meet the second and third (2013-17 and 2018-22) carbon budgets. The fourth carbon budget (2023-27) caps emissions at 52% below 1990 levels. The CCC has recommended that the fifth carbon budget (2028-32) limits emissions to 57% below 1990 levels and the government must legislate for it by June 2016.

## EU NEW CAR CO<sub>2</sub> REGULATION TO DRIVE TECHNOLOGY CHANGE – POST 2020 TARGETS TO BE FORMULATED

As part of the EU's target to cut greenhouse gases (GHG) by 20% by 2020 (from 1990 levels) the New Car CO<sub>2</sub> Regulation set a target for the EU new car fleet to be 95g/km in 2021. This would require a 4.8% rate of improvement per annum if the UK were to meet the pan-EU new car target (which it is not legally bound to achieve).

The European Commission is committed to bring forward a post-2020 CO<sub>2</sub> regime proposal by Q4 2016/Q1 2017. This is expected to be a continuation of the current pan European sales weighted CO<sub>2</sub> g/km target, although it will likely be based on the new WLTP test cycle, which is to be introduced from 2017. However, different options could exist, for example a pathway based on numerous metrics which might influence the uptake of EVs or planned CO<sub>2</sub> reductions for ICEs and defined

targets for EV uptake. The Commission is expected to have agreed targets, and their form, by mid 2019.

## TECHNOLOGY SHIFT, INCLUDING ELECTRIFICATION OF THE FLEET

ICEs will continue to play an important role in vehicle markets for many years to come. The lowest conventional ICE is currently emitting 79g/km. However, the rate of progress will be technically limited, especially if reasonable costs are to be applied. The outlook therefore for uptake of alternatively fuelled vehicles, principally plug-in and hydrogen-fuelled vehicles, will be very important.

The CCC's Carbon Budget scenarios put the UK's car (and van) parc close to zero carbon by 2050, with all new cars zero emitting by 2040. CCC suggest 60% of new cars will be zero capable vehicles by 2030 (of which 30% are pure EVs and the remaining 70% plug-in electric hybrids), and estimate 9% of new cars and vans will be plug-in by 2020. Not many forecasters provide such long term outlooks, with ACEA envisaging the market for electric cars to be 2-8% by 2020. The CCC's full recommendations for road transport can be found at [www.theccc.org.uk/charts-data/ukemissions-by-sector/transport](http://www.theccc.org.uk/charts-data/ukemissions-by-sector/transport).

Given the current market for pure EVs represented 0.4% in 2015 (at less than 10,000 units) and 1.1% when including plug-in hybrids (less than 30,000 units), an enormous market transformation is required to deliver the 1.5-1.8 million plug-in vehicles each year to be 60% of the market in 2030 (assuming 2.5-3 million new car market). This suggests compound growth of over 30% per annum, which would see the 2030 market rise by over 400,000 units – which is equivalent to the current world production of zero capability vehicles.

## MARKET TRANSFORMATION REQUIRES A COMPREHENSIVE APPROACH

Delivering such market transformation cannot be achieved by vehicle manufacturers alone. The comprehensive, or integrated, approach seeks to reduce CO<sub>2</sub> emissions more effectively by drawing on a full spectrum of solutions, whether this relates to the vehicle itself, faster fleet renewal, intelligent transport systems (ITS), improving infrastructure, decarbonising fuels or altering driver behaviour. These changes will require all stakeholders; this includes industry, fuel suppliers, government and policy makers, media and consumers, to move forward in a common direction. To complement this, manufacturers are also pioneering alternative mobility concepts, such as car sharing, which can contribute to reducing emissions. Combined with the industry's continuous improvements in vehicle technology, these measures have the potential to address CO<sub>2</sub> emissions more successfully. ACEA has set out key recommendations for a comprehensive approach – see [www.acea.be/publications/article/background-reducing-co2-emissions-from-cars-and-vans](http://www.acea.be/publications/article/background-reducing-co2-emissions-from-cars-and-vans).

## GOVERNMENT SUPPORT FOR LOWER CO<sub>2</sub> EMITTING VEHICLES AHEAD

The COP21 (21st Conference of Parties) in December saw the Zero Emission Alliance, a collective of 14 national and sub-national governments, including UK government, Germany, Netherlands, Norway and California sign an agreement to make all new passenger vehicles zero emitting as fast as possible, and no later than by 2050. As identified earlier, the UK's own targets are for all new cars and vans to have zero emitting capability by 2040.

In the short-term, the UK is committed to supporting the emerging EV market. The 2015 Spending Review confirmed £600 million government funding for ULEVs between 2015-16 and 2020-21. This includes support measures such as the Plug-in Car Grant to 2018. The grant provides a very visible, important and attractive up-front incentive to new car buyers and has helped lift the UK to be Europe's second largest market for electric vehicles, after Netherlands (source: ACEA). Ensuring adequate longer-term fiscal and policy support is key to ensuring this sector gains a solid foothold in the marketplace. In addition, taxation measures, such as Vehicle Excise Duty and Company Car Tax, infrastructure and other such measures are also necessary to ensure consumers see these vehicles as relevant and that they become the norm in the marketplace.

As outlined earlier in this report, industry has concerns that forthcoming change to VED and CCT regimes, will diminish the incentive for plug-in electric vehicles, and also remove the incentive for used car buyers to purchase lower emitting vehicles. ULEVs require long-term support and signals to encourage market transformation and it is a matter for further debate to understand when the tipping points are for these markets to be established and capable of growing without support.

SMMT welcomes government's on-going commitment to support the manufacturer of low-carbon technologies in the UK. Projects such as the Advanced Propulsion Centre help foster

innovation, investment and commercialisation of lower carbon technologies here in Britain. Connected and autonomous vehicles can also bring CO<sub>2</sub> benefits and further enhance the shift to zero emission vehicles. Government has also been supportive of the push to these technologically advanced vehicles.

## BALANCING AIR QUALITY AND CO<sub>2</sub> PERFORMANCE

Typically the less fuel used, the lower both CO<sub>2</sub> and other pollutant emissions. The move to ULEVs and ultimately zero emission vehicles can help achieve this. However, sometimes measures to improve air quality can increase CO<sub>2</sub>, and vice-versa, and so stakeholders should look to ensure a balanced approach is taken. In particular, industry is concerned that short-term measures to curb diesel use, could undermine achieving CO<sub>2</sub> targets.

Collective, considered and unified action by stakeholders can ensure the UK motor industry is at the heart of delivering on all fronts, achieving meaningful market transformation of the whole fleet to deliver both air quality and CO<sub>2</sub> benefits, whilst promoting economic growth. ■

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