Introduction of the new WLTP test will deliver CO₂ figures which by law and witnessed by a government appointed agency. The European Driving Cycle (NEDC) laboratory test, which is required van fleets. The figures reported are derived from the official New

The average new car emitted 120.1g/km CO₂ in 2016, down 1.1% on 2015’s performance and 33.6% below that of 2000. This was supported by a 22.2% rise in registrations of alternatively-fuelled vehicles, which tend to have CO₂ emissions on average 40% below the market average. For the UK independently to achieve the pan-European target of 95g/km by 2021, however, there would need to be a significant increase in the rate of progress, to 4.6% per annum.

2017 marks the start of a period of change and uncertainty. The European Commission is expected to publish its proposals for the post-2020 new car and van CO₂ Regulations and introduce CO₂ monitoring requirements for heavy commercial vehicles. From September there will be a new test cycle for new types from which CO₂ figures are derived – the World Light vehicle Test Procedure (WLTP). At the same time the new Real Driving Emissions (RDE) tests will be introduced to the Euro standard to help alleviate air quality issues. On a political level, 2017 is likely to mark the formal start of the process by which the UK exits the EU.

This 16th annual report demonstrates SMMT’s open and transparent approach to CO₂ emissions from the UK’s new car and van fleets. The figures reported are derived from the official New European Driving Cycle (NEDC) laboratory test, which is required by law and witnessed by a government appointed agency. The introduction of the new WLTP test will deliver CO₂ figures which are more representative of what the consumer can achieve, in the “real world”, given the cycle moves closer to replicating current, more aggressive driving patterns and has more precise guidance on the test procedure itself. In time, the move to WLTP will have knock on effects on how consumer information is provided, giving industry the opportunity to use more consumer-relevant data. It will also impact on vehicle taxation, potentially reinforcing the benefits of using a lower emitting vehicle and the importance of efficient driving techniques.

Electric vehicles (EVs) provide “tailpipe” CO₂ and air quality benefits. Pleasingly, there was a 15% rise in the number of pure EVs and plug-in hybrid vehicles available in 2016 with more than 30 models in showrooms, a number that is set to double over the next three years. Registrations of these zero-emission capable vehicles rose by 28.6% to 36,907 units in 2016. While there are still several barriers to overcome if these vehicles are to become mainstream, there is still a need for industry, government and other stakeholders to work together. Concerns about the availability of charging infrastructure remain and, whilst there is on-going incentives and preferential tax treatment to encourage the take up of these vehicles, the changes to Vehicle Excise Duty, coming in April, may have a detrimental impact.

Industry looks to the latest Euro standard, Euro 6, introduced in 2015 and re-enforced by the Real Driving Emission test (to be introduced in 2017 and fully implemented in 2019), to help restore confidence in new cars and their ability to improve air quality. The standard moves new diesel engines towards equivalency with petrol engines and requires sophisticated after-treatment systems to absorb emissions or convert them into nitrogen or water. Unless new vehicles meet these tests they cannot be type-approved and put on the market. Diesel plays a key role in contributing to reducing CO₂ emissions so industry is keen to ensure that new diesels are not penalised by public policy. Diesels offer particular CO₂ savings for long distances and transporting heavy loads, so any measures to encourage drivers into lower emitting vehicles should assess the impacts on both climate change and urban air quality.

Whilst new vehicles deliver ever-lower levels of CO₂ emissions, the impact of older vehicles cannot be underestimated as they remain significant contributors to overall CO₂ emissions, accounting for more than 90% of vehicles in use. Engaging with all stakeholders, notably policy makers, government and consumers, in a comprehensive approach towards fleet renewal will be necessary to help secure growth in the UK motor industry to deliver environmental objectives as quickly as possible. This could include speeding up the pace of fleet renewal, encouraging the take-up of alternatively-fuelled vehicles, enabling intelligent transport systems and connected vehicles to optimise efficiency of the fleet, improving transport infrastructure and encouraging drivers to drive more efficiently.

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25. CONCLUSION
The 16th New Car CO2 Report outlines UK automotive performance relating to CO2 emissions, market trends and the different development drivers. For more detailed findings and regular updates see [www.smmt.co.uk/CO2report](http://www.smmt.co.uk/CO2report)
AVERAGE NEW CAR CO₂ EMISSIONS FALL TO NEW LOW, OF 120.1G/KM, IN 2016

- Average new car CO₂ down 33.6% since 2000 and some 20% lower than average car in use.
- Performance supported by 22.2% increase in alternatively-fuelled cars to almost 90,000 units.
- UK had the largest zero emission capable car market in Europe, after a 28.6% volume rise.
- Progress was slowed by a reduction in diesel car share, which fell 0.8% points to 47.7%.
- Market shift, notably from Supermini to Dual Purpose segment, has also adversely impacted on the fleet average CO₂ performance.
- Average light commercial vehicle CO₂ was 173.7g/km in 2016, down 1.9%.
- Total CO₂ emissions from all vehicles in use cut by 4.6% between 2000 and 2015, while emissions rose by 1.9% on 2014, reflecting an increase in miles driven.

This report uses CO₂ figures from the official NEDC laboratory test, which is required by law and witnessed by a government appointed agency. Real world performances may differ, due to a number of factors (such as driving style, weather conditions, vehicle load, congestion etc), which laboratory tests are designed to remove and so provide comparative figures.

From September 2017, a new laboratory test will be introduced, known as WLTP test, which will use a different test cycle, designed to be more akin to typical driving patterns and will more clearly define the test procedures. These forthcoming changes are welcomed by industry and should help rebuild trust and confidence in the data supplied to consumers and other stakeholders. The test cycles are discussed in more detail later in the report.
**DATA SUMMARY**

### TABLE 1 | AVERAGE CO₂ EMISSIONS AND REGISTRATIONS

<table>
<thead>
<tr>
<th>CO₂ g/km (sales weighted average)</th>
<th>2000</th>
<th>2007</th>
<th>2015</th>
<th>2016</th>
<th>'16v'15</th>
<th>'16v'16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total market</td>
<td>181.0</td>
<td>164.9</td>
<td>121.4</td>
<td>120.1</td>
<td>-1.1%</td>
<td>-33.6%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>2,222</td>
<td>2,404</td>
<td>2,634</td>
<td>2,693</td>
<td>2.3%</td>
<td>21.2%</td>
</tr>
</tbody>
</table>

#### BY FUEL TYPE

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>2000</th>
<th>2007</th>
<th>2015</th>
<th>2016</th>
<th>'16v'15</th>
<th>'16v'16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel</td>
<td>1677</td>
<td>164.3</td>
<td>121.5</td>
<td>120.1</td>
<td>-1.2%</td>
<td>-28.4%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>313</td>
<td>967</td>
<td>1,277</td>
<td>1,285</td>
<td>0.6%</td>
<td>310.3%</td>
</tr>
<tr>
<td>Petrol</td>
<td>183.2</td>
<td>193.6</td>
<td>124.2</td>
<td>123.7</td>
<td>-0.4%</td>
<td>-32.5%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>1,908</td>
<td>1,420</td>
<td>1,284</td>
<td>1,319</td>
<td>2.7%</td>
<td>-30.9%</td>
</tr>
<tr>
<td>AFV</td>
<td>127.3</td>
<td>127.0</td>
<td>68.2</td>
<td>66.8</td>
<td>-2.1%</td>
<td>-47.5%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>0</td>
<td>17</td>
<td>73</td>
<td>89</td>
<td>22.2%</td>
<td>24807.3%</td>
</tr>
</tbody>
</table>

#### BY SALES TYPE*

<table>
<thead>
<tr>
<th>Sales Type</th>
<th>2000</th>
<th>2007</th>
<th>2015</th>
<th>2016</th>
<th>'16v'15</th>
<th>'16v'16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>176.4</td>
<td>165.8</td>
<td>122.9</td>
<td>122.3</td>
<td>-0.5%</td>
<td>-30.7%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>1,212</td>
<td>1,046</td>
<td>1,209</td>
<td>1,206</td>
<td>-0.2%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>Fleet</td>
<td>175.4</td>
<td>164.0</td>
<td>119.8</td>
<td>118.3</td>
<td>-1.3%</td>
<td>-32.6%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>1,031</td>
<td>1,195</td>
<td>1,318</td>
<td>1,381</td>
<td>4.8%</td>
<td>33.9%</td>
</tr>
<tr>
<td>Business</td>
<td>195.0</td>
<td>165.9</td>
<td>122.2</td>
<td>119.0</td>
<td>-2.6%</td>
<td>-39.0%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>214</td>
<td>163</td>
<td>107</td>
<td>106</td>
<td>-1.2%</td>
<td>-50.6%</td>
</tr>
</tbody>
</table>

#### BY SEGMENT

<table>
<thead>
<tr>
<th>Segment</th>
<th>2000</th>
<th>2007</th>
<th>2015</th>
<th>2016</th>
<th>'16v'15</th>
<th>'16v'16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini</td>
<td>153.8</td>
<td>126.5</td>
<td>106.7</td>
<td>105.5</td>
<td>-1.2%</td>
<td>-31.4%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>52</td>
<td>22</td>
<td>70</td>
<td>77</td>
<td>9.0%</td>
<td>46.8%</td>
</tr>
<tr>
<td>Supermini</td>
<td>152.9</td>
<td>141.8</td>
<td>111.8</td>
<td>111.1</td>
<td>-0.6%</td>
<td>-27.4%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>689</td>
<td>771</td>
<td>926</td>
<td>873</td>
<td>5.8%</td>
<td>26.8%</td>
</tr>
<tr>
<td>Lower Medium</td>
<td>175.3</td>
<td>158.6</td>
<td>116.0</td>
<td>114.8</td>
<td>-1.0%</td>
<td>-34.5%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>662</td>
<td>722</td>
<td>716</td>
<td>735</td>
<td>2.7%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Upper Medium</td>
<td>192.4</td>
<td>169.1</td>
<td>121.7</td>
<td>119.0</td>
<td>-2.2%</td>
<td>-38.2%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>477</td>
<td>386</td>
<td>249</td>
<td>257</td>
<td>3.0%</td>
<td>-46.1%</td>
</tr>
<tr>
<td>Executive</td>
<td>235.6</td>
<td>192.6</td>
<td>126.0</td>
<td>120.8</td>
<td>-4.1%</td>
<td>-48.7%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>105</td>
<td>104</td>
<td>128</td>
<td>128</td>
<td>0.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Luxury</td>
<td>292.3</td>
<td>273.8</td>
<td>191.2</td>
<td>182.4</td>
<td>-4.6%</td>
<td>-37.6%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>11</td>
<td>13</td>
<td>9</td>
<td>11</td>
<td>15.9%</td>
<td>-7.9%</td>
</tr>
<tr>
<td>Sports</td>
<td>220.5</td>
<td>224.0</td>
<td>158.0</td>
<td>161.4</td>
<td>2.1%</td>
<td>-26.8%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>67</td>
<td>66</td>
<td>49</td>
<td>50</td>
<td>1.3%</td>
<td>-25.9%</td>
</tr>
<tr>
<td>Dual Purpose</td>
<td>259.4</td>
<td>228.3</td>
<td>147.7</td>
<td>141.4</td>
<td>-4.3%</td>
<td>-45.5%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>99</td>
<td>176</td>
<td>355</td>
<td>438</td>
<td>23.3%</td>
<td>341.4%</td>
</tr>
<tr>
<td>MPV</td>
<td>211.0</td>
<td>179.7</td>
<td>131.4</td>
<td>128.7</td>
<td>-2.1%</td>
<td>-39.0%</td>
</tr>
<tr>
<td>Registrations ('000s)</td>
<td>60</td>
<td>44</td>
<td>131</td>
<td>125</td>
<td>-4.3%</td>
<td>109.2%</td>
</tr>
</tbody>
</table>

*Sales type data is since 2001 only.

**GLOSSARY**

- AFV: Alternative Fuelled Vehicle
- CO₂: Carbon Dioxide
- EV: Electric Vehicle
- LCV: Light Commercial Vehicle
- OLEV: Office for Low Emission Vehicles
- ULEZ: Ultra-Low Emission Zone
- WLTP: World Harmonised Light Vehicles Test Procedure
- BEIS: Department for Business, Energy, Innovation and Skills
- CCT: Company car tax
- DfT: Department for Transport
- g/km: grams per kilometre
- ICE: Internal combustion engine
- PHEV: Plug-in Hybrid Electric Vehicle
- ULEV: Ultra-Low Emission Vehicles (<75g/km CO₂)
- VED: Vehicle Excise Duty
- ZEV: Zero Emission Vehicle

**DEFINITIONS**

See SMMT ULEV Guide for full details.

- **Internal combustion engine (ICE)**: Petrol or diesel engine, including those adapted to operate on alternative or gaseous fuels.
- **Battery electric vehicle (EV)**: Solely powered by a battery charged from the electricity grid. They have zero emissions from the tailpipe, although some emissions maybe associated with the production of the electricity.
- **Hybrid**: Powered by an ICE, but has a battery and electric motors to capture and re-use braking energy.
- **Plug-in hybrid electric vehicle (PHEV)**: Vehicles with a plug-in battery and an ICE.
- **Ultra Low Emission Vehicle (ULEV)**: An ultra-low emission vehicle produces 75g/km or less of CO₂.

**THE SOCIETY OF MOTOR MANUFACTURERS AND TRADERS**

New Car CO₂ Report 2017 | Page 5
AVERAGE NEW CAR CO₂ EMISSIONS REACH NEW LOW OF 120.1G/KM

UK average new car CO₂ emissions continued to decline in 2016, to just 120.1g/km. This was 33.6% below the 2000 level of 181.0g/km and is down from 164.9g/km in 2007, a 27.2% reduction. However, the reduction was a relatively modest 1.1% on 2015’s 121.4g/km average. This was the slowest rate of decline since 2004 and is well below the 3.5% averaged since 2008. The slowdown in the rate of improvement may represent the increasing challenge of delivering further technological gains, but is also reflective of consumer demand and market trends, most notably a shift in vehicle segment type towards higher CO₂ emitting segments as well as a decline in diesel penetration (given diesels typically emit around a fifth lower CO₂ than the equivalent performance petrol engine vehicle). The ongoing progress in market transformation to alternatively fuelled vehicles continued, with a 22.2% rise in registrations to 88,919 units.

FUTURE CO₂ TARGETS REMAIN CHALLENGING

While the UK’s 2015, and indeed 2016, performance bettered the pan European target of a 130g/km in 2015, achieving the 2021 target of 95g/km will be very challenging. It will require a 20.9% cut in CO₂ emissions over the next five years, or 4.6% per annum. As chart 2 shows, this is above the rate averaged since 2008, well above the 2016 rate of progress and has only been bettered in one year – 2009 (when the scrappage scheme was in effect) – in the UK to date. Delivering such a pick-up in the rate of improvement will be difficult and likely require even more costly measures, given lower cost measures are progressively undertaken, or a step-change in consumer acceptance of different types of vehicles, eg alternatively-fuelled. Rising consumer prosperity and low fuel prices might also have softened demand for more efficient vehicles.
HOW CO₂ DATA IS DERIVED

CO₂ data in this report is taken from the results of the official laboratory test for 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’ CO₂ levels to the MVRIS registration database to give average, sales weighted, data.

From September 2017, a new test procedure – the Worldwide Light vehicle Test Procedure (WLTP) - will be introduced to measure CO₂ emissions. This will help provide a more realistic figure for consumers, although real-world figures will always be specific because they are based on a variety of factors – notably 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 versus ‘real world’ performance, as it is difficult for consumers to replicate exactly a vehicle’s test cycle.

The CO₂ figure is stated on each vehicle’s Certificate of Conformity (CoC - the document used to prove that the vehicle complies with all the regulations). Currently this is derived from the New European Driving Cycle (NEDC) test, but from September 2017 will switch to the WLTP for all new models and from September 2018 for all vehicles. Tests are conducted in a laboratory to enable consumers to make like-for-like comparisons between the CO₂ 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. The WLTP test will be also performed under strict procedures to bring the results closer to real world, eg road load or resistance, gear shifts, vehicle weight, tyre type and pressure, fuel quality, ambient temperature and 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 (see Chart 3).

IMPLICATIONS FOR CO₂-BASED MEASURES

Given the different speeds, cycles and procedures between the NEDC and WLTP tests, it is to be expected that they will deliver different results. The WLTP is likely to produce a higher CO₂ figure in many situations, possibly as much as 20% for some vehicles, compared with the NEDC. This will have implications for measures associated with a vehicle’s CO₂ performance, including the European New Car CO₂ Regulation, motoring taxes, the new car label (the label showing fuel consumption and CO₂ performance that must be displayed alongside a car in showrooms) and consumer information (advertising and marketing). There will be a transitional period, when vehicles with either WLTP or NEDC measured CO₂ figures could be available alongside each other, and so a system to provide a correlation method from WLTP to an NEDC-equivalent figure has been established.

The move to introduce WLTP will give consumers better information about the CO₂ performance of a vehicle. Industry and other stakeholders should optimise this opportunity to further engage with consumers about the benefits of buying and using a more efficient vehicle. Clear and consistent messaging is needed and measures which downplay the new cycle or suggest vehicles using it are any less efficient than under the old cycle must be avoided. The EU labelling Directive will not be amended ahead of September 2017 and until it is manufacturers, by law, must publish NEDC data. A single transition date could be adopted, once all new cars are using the new cycle, to avoid distortions or confusion in the market. The new cycle should not be used to raise additional taxes from consumers or tighten future new CO₂ targets for manufacturers.

CHART 3 | NEDC AND WLTP TEST CYCLES – FOUR PHASES OF WLTP DIFFERENTIATED
Progress continues, with market shift to lower emitting variants.

Alternatively fuelled cars, which on average emit 40% lower CO₂, see volumes rise 22.2% in 2016.

Diesel market share slips again, with an adverse impact on overall CO₂ performance.

While all segments have seen average CO₂ emissions fall since 2007, market transformation to higher CO₂ emitting segments – especially in 2016 – has been an influence.

MARKET TRENDS MIXED FOR CO₂ PERFORMANCE GAINS

2016 was another very positive year for the UK automotive industry. Average new car CO₂ emissions fell to another new low, whilst registrations rose for a fifth successive year. The market at 2,693 million units in 2016 was up 2.3% on 2015 and has grown by more than 750,000 units or 38.7% since the low of 2011, 1,941 million units. The 2016 market was 12% or almost 300,000 units above 2007’s pre-recession total. Fleet registrations rose by 4.8% to represent 51.3% of the market total, while private and business demand dipped in the year. Diesel registrations rose by 0.6% to a record 1.285 million units, but were outpaced by petrol and AFVs – up 2.7% and 22.2% respectively. Diesel market share therefore slipped back to 47.7% in 2016, as evident in the chart below. AFV share rose by 0.5 percentage points in 2016 to 3.3%. UK-built cars took a 14.1% share of the market; the highest level since 2010.

MARKET SHIFT TO LOWER CO₂ EMITTING PRODUCTS

The overall market has moved into lower CO₂ emitting products, with a particular step-change in performance since 2008. This follows not only increased availability of lower CO₂ emitting products – reflective of investment in both traditional internal combustion engine technologies - but, also the arrival of new alternatively-fuelled vehicles, notably hybrid and pure electric vehicles. The pan-European New Car CO₂ Regulation, consumer demand and market competition has helped drive this. The recession, meanwhile, helped focus consumers on lower-cost/more efficient motoring, while CO₂ based taxes and increased media focus has helped encourage consumers to switch to lower CO₂ emitting products.

The market profile, by selected 5g/km CO₂ bands, is illustrated in Chart 5. In 2016 and 2015 the profiles were similar, and both showed significant variation to that in 2000 or 2007 - with a shift to lower CO₂ emitting vehicles (lines moving to the left). While there was the same proportion of zero emitting (ie electric) cars in both 2016 and 2015, at 0.4%, there was a larger proportion of 1-50g/km cars in 2016 (1% vs 0.7% in 2015), following the growth in plug-in electric hybrids. In 2016 a new high of 74.8% of the market emitted 130g/km or less (vs 72% in 2015 and just 10.6% in 2007). The share below 95g/km dipped a little in 2016, to 8.6% (from 9.2% in 2015) but has still shown considerable growth from 0% in 2007.

Vehicle type – notably by fuel and segment – influences the average CO₂ emissions performance, and this section now focuses on these.

CO₂ EMISSIONS BY FUEL TYPE

In the UK broadly half the market is petrol and half diesel – see chart 6. Whilst diesels are some 20% lower CO₂ emitting on a like-for-like performance basis (eg engine power), on a sales-weighted average, these two internal combustion engines (ICEs) offer very similar overall CO₂ emissions. This is in part demonstrated in Table 2 below, showing the lowest CO₂ emitting petrol and diesel variant of the best-selling model in each segment. This shows the diesel variant is on average 18.4% lower CO₂ emitting, with a range of up to 28% (note these are indicative differences, and given the performance and specifications of the models may not be directly comparable). The similar overall performance reflects diesel engines tending to be fitted into larger vehicles – given their higher cost and larger physical size (larger cubic capacity and often with use of turbochargers to deliver similar power). The diesel penetration in different segments is presented in Chart 15.

Diesel penetration rose rapidly between 2000 and 2011, from 14% to 50.6%. It peaked at 50.8% in 2012, but has been broadly around 48-51% since 2011. Between 2011 and 2014 diesel share
was actually higher than petrol, as consumers switched to get the benefits of the lower CO₂ performance and increased fuel economy, as well as improvements in the refinement and driveability of diesel products. Diesel share has fallen in each of the past two years, and fell 0.8 percentage points to 47.7% share in 2016, despite a 0.6% rise in registrations to 1.285 million units. The shift to alternatively-fuelled vehicles, as well as other market factors, have caused this shift.

Higher registrations of alternatively fuelled vehicles (AFVs) have been very positive for CO₂ performance. As evident in chart 10, AFVs emit around 40% less CO₂ on average than a typical petrol or diesel car. Chart 6 shows how AFVs have entered the market and now command a 3.3% market share, up from 2.8% in 2015 and less than 1% as recently as 2009.

Pure electric vehicles (pure EVs - those using only battery power) and hydrogen-fuelled cars have zero emissions from the tail pipe. Hybrids have both electric power and an ICE, while a plug-in hybrid electric vehicle (PHEV) can run on electricity from the national grid and so has zero emission capability.

AFV registrations rose by 22.2% to 88,919 units. The market for pure EVs rose by a modest 3.3% to 10,264 units, whilst the PHEV market rose by 41.9% to 22,643 units in 2016 and the number of AFV models available rose to more than 70 in 2016, up over 10% on 2015. This included five more PHEV models (so total up 38.5%) and four petrol electric hybrid models. There is now an AFV available in every vehicle segment and nearly all the segments have a zero-emission capable vehicle. Go Ultra Low (GUL – see page 14) expects the number of zero-emission capable models to double to 30 over the next three years.

The Nissan Leaf remained the best selling pure EV, accounting for 45.4% of registrations in the year, but, recorded an 11% decline in volumes. The Mitsubishi Outlander was the best selling PHEV in 2016, but with a 19.8% decline in volumes its market share fell from 62.2% to 35.2%. The BMW 3 Series, Mercedes C-Class and Volvo XC90 were all relatively new entrants to this segment and in 2016 collectively accounted for 40% of volumes, with more than 10,500 registrations in total. Toyota and Lexus collectively accounted for 91.7% of the petrol hybrid market, with both the Toyota Yaris and Auris exceeding 10,000 registrations in the year. Petrol hybrids accounted for 56.5% of all AFVs in 2016, and recorded a 25.1% rise in volumes to 50,261 units in 2016. Diesel hybrid volumes fell 55% in 2016, as several key brands in the segment switched their focus to the PHEV sector.

**Table 2**: Segment best seller, 2016, including lowest diesel and petrol model’s CO₂ performance

<table>
<thead>
<tr>
<th>Market Segment</th>
<th>Model</th>
<th>Registrations in 2016</th>
<th>Lowest diesel CO₂</th>
<th>Lowest petrol CO₂</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A MINI</td>
<td>HYUNDAI I10</td>
<td>23,657</td>
<td>n/a</td>
<td>98</td>
<td>n/a</td>
</tr>
<tr>
<td>B SUPERMINI</td>
<td>FORD FIESTA</td>
<td>120,525</td>
<td>82</td>
<td>99</td>
<td>-17.2%</td>
</tr>
<tr>
<td>C LOWER MEDIUM</td>
<td>FORD FOCUS*</td>
<td>70,545</td>
<td>88</td>
<td>99</td>
<td>-11.1%</td>
</tr>
<tr>
<td>D UPPER MEDIUM</td>
<td>BMW 3 SERIES*</td>
<td>36,732</td>
<td>99</td>
<td>122</td>
<td>-18.9%</td>
</tr>
<tr>
<td>E EXECUTIVE</td>
<td>MERCEDES C CLASS*</td>
<td>44,184</td>
<td>101</td>
<td>123</td>
<td>-17.9%</td>
</tr>
<tr>
<td>F LUXURY SALON</td>
<td>MERCEDES S CLASS*</td>
<td>3,338</td>
<td>141</td>
<td>196</td>
<td>-28.1%</td>
</tr>
<tr>
<td>G SPECIALIST SPORTS</td>
<td>Audi TT</td>
<td>9,836</td>
<td>110</td>
<td>137</td>
<td>-19.7%</td>
</tr>
<tr>
<td>H DUAL PURPOSE</td>
<td>KIA SPORTAGE</td>
<td>40,083</td>
<td>119</td>
<td>147</td>
<td>-19.0%</td>
</tr>
<tr>
<td>I MULTI PURPOSE</td>
<td>FORD C-MAX</td>
<td>18,196</td>
<td>99</td>
<td>117</td>
<td>-15.4%</td>
</tr>
</tbody>
</table>

*note alternatively fuelled variants of these models are available, which would offer greater CO₂ savings
NEW CAR MARKET TRENDS AND CO₂ PERFORMANCE

**Chart 9** shows the market for cars with CO₂ emissions below 95g/km. AFVs accounted for 30% of the 2016 market, although that rises to more than 99% for cars up to 80g/km. Meanwhile, in the below 95g/km segment, petrol cars accounted for 20% of the total and diesels 50%. The Peugeot 208 was the lowest emitting diesel car in 2016, at 79g/km, and the Suzuki Celerio was the lowest emitting petrol car, at 84g/km.

The registrations of top-selling brands of AFVs are detailed in **Chart 10**. These five manufacturers represented 80% of the AFV market. Toyota, the largest AFV manufacturer, accounted for almost 37% of the total AFV market. AFVs represented more than a third of Toyota’s total UK registrations, while for Lexus the share was 97% and for Mitsubishi more than 50%.

**Chart 11** shows the top five selling ULEV brands. These five brands account for 70.7% of the ULEV market, with Mitsubishi alone accounting for more than half.

**CO₂ PERFORMANCE BY SEGMENT TYPE**

SMMT differentiates the market into nine different segment types, broadly based on vehicle size and body style. All segments have seen CO₂ emissions fall over time as ultra-low emitting variants become more widely available. However, in 2016 there was a marked shift towards the Dual Purpose segment, which has higher than average CO₂ emissions, because vehicles in this segment are typically larger and feature heavier four-wheel drive systems.

All segments have seen average CO₂ emissions fall since 2007, by between 18% and 38%, and all bar the sports car segment recorded a decline in 2016 on 2015. The Luxury Saloon segment showed the largest fall of 4.6%, closely followed by the Dual Purpose segment. **Chart 12** shows the average CO₂ emissions of the different segments since 2000.
The change in composition of the market has also been important in shaping the overall CO₂ average. Since 2007, there has been a shift into the Dual Purpose segment and MPVs, as well as the Mini and Supermini segments, as shown in Chart 13. Chart 14 shows the change in market share in 2016 compared with 2000 and 2015. This re-enforces the long term trend from more traditional family cars to Dual Purpose, MPV and Supermini and Mini segments. However, in 2016 compared with 2015, the shift was almost solely from the Supermini to Dual Purpose segment. There was a 2.5 percentage point move in market share from Supermini to Dual Purpose segment in 2016, which is significant to the overall market’s CO₂ performance because the average Dual Purpose vehicle’s CO₂ emissions were 27.3% higher than the average Supermini’s. While this segment shift may be reflective of the timing of different models’ replacement cycles, it also shows consumers’ appetite for larger and higher-spec vehicles.

Chart 15 shows the share of diesel and alternatively-fuelled cars in each segment. In 2016, alternatively-fuelled vehicles were available in every segment and in all but two (Executive and Luxury), zero-emission capable vehicles were available. If the lowest emitting variant in each segment were to be bought then the average new car CO₂ would have emitted just 2.5g/km in 2016, and even a switch to the lowest internal-combustion engined vehicle would have brought the average down 27.4% to 87.3g/km. It should be noted that the lowest emitter would not suit every user, and vehicle choice is often based on a number of factors, including price, running costs, size, range and dealer location.
INFLUENCE OF CO₂-BASED TAXES ON NEW CAR CO₂ AVERAGE

ARRAY OF CO₂-BASED TAXES IN PLAY

The UK was at the forefront of introducing CO₂-based taxes to influence consumers’ vehicle choice. Vehicle excise duty (VED), the vehicle circulation tax, has been CO₂-based since 2001, while company car tax (CCT) followed suit in 2002. Capital allowances are also based on CO₂. In addition, there is the backdrop that the UK has the highest fuel duty (in both absolute value and as proportion of total pump price) in Europe. Furthermore, some local taxes, such as the London Congestion Charge and parking permits are also CO₂-related.

VEHICLE EXCISE DUTY (VED)

Originally introduced with four bands VED was broadened out to 13 bands in 2009, and in 2010 a differential first year rate was introduced. Table 3 shows the current VED bands and rates for 2016-2017 and new ones that apply from 1 April 2017, and the corresponding market shares. Chart 16 also shows the market by VED band and shows how it has changed since 2000 (if the current banding had been in place then).

In 2016 18.2% of the market was below 100g/km and so in band A and subject to £0 on the standard rate. Cars in bands A to D pay £0 on the first year rate, and in 2016 74.8% of the market was in these bands, up from 72.0% in 2015 and just 10.6% in 2007. These bands did not account for half of the market until 2012. The average user paid £54 in the first year, broadly half the level of just five years before (2011). A car actually paying any first year rate was subject to an average tax of £213 – a figure broadly unchanged since the first year rate was introduced. Just 0.4% of the market was in the top band, M, and so subject to the maximum £1,120 first year fee. The proportion of the market in this band is also broadly unchanged since 2012, although the level is almost a tenth of that seen in 2007.

In April 2017 the current VED will be revised. There will remain 13 bands (see Chart 16), but they will be redistributed and new rates introduced ranging from £0-£2,000 – so the maximum is 79% higher than under the current scheme. The standard rate for all non-zero emitting cars will become a flat rate £140. Industry was disappointed with the lack of consultation when these new bands

<table>
<thead>
<tr>
<th>Band</th>
<th>Current bands (CO₂g/km)</th>
<th>Current 1st year/standard rate*</th>
<th>2016 market share</th>
<th>New bands - April 2017 (CO₂g/km)</th>
<th>New 1st year/standard rate</th>
<th>2016 market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Up to 100</td>
<td>£0 / £0</td>
<td>18.2%</td>
<td>0</td>
<td>£0 / £0</td>
<td>0.4%</td>
</tr>
<tr>
<td>B</td>
<td>101-110</td>
<td>£10 / £20</td>
<td>22.1%</td>
<td>1-50</td>
<td>£10 / £140</td>
<td>0.6%</td>
</tr>
<tr>
<td>C</td>
<td>111-120</td>
<td>£0 / £30</td>
<td>20.9%</td>
<td>51-75</td>
<td>£25 / £140</td>
<td>0.4%</td>
</tr>
<tr>
<td>D</td>
<td>121-130</td>
<td>£0 / £110</td>
<td>13.6%</td>
<td>76-90</td>
<td>£100 / £140</td>
<td>2.6%</td>
</tr>
<tr>
<td>E</td>
<td>131-140</td>
<td>£130 / £130</td>
<td>9.7%</td>
<td>91-100</td>
<td>£120 / £140</td>
<td>14.0%</td>
</tr>
<tr>
<td>F</td>
<td>141-150</td>
<td>£145 / £145</td>
<td>5.8%</td>
<td>101-110</td>
<td>£140 / £140</td>
<td>22.1%</td>
</tr>
<tr>
<td>G</td>
<td>151-165</td>
<td>£185 / £185</td>
<td>4.7%</td>
<td>111-130</td>
<td>£160 / £140</td>
<td>34.5%</td>
</tr>
<tr>
<td>H</td>
<td>166-175</td>
<td>£300 / £210</td>
<td>1.5%</td>
<td>131-150</td>
<td>£200 / £140</td>
<td>15.5%</td>
</tr>
<tr>
<td>I</td>
<td>176-185</td>
<td>£355 / £230</td>
<td>1.4%</td>
<td>151-170</td>
<td>£500 / £140</td>
<td>5.4%</td>
</tr>
<tr>
<td>J</td>
<td>186-200</td>
<td>£500 / £270</td>
<td>0.5%</td>
<td>171-190</td>
<td>£800 / £140</td>
<td>2.5%</td>
</tr>
<tr>
<td>K</td>
<td>201-225</td>
<td>£650 / £295</td>
<td>0.9%</td>
<td>191-225</td>
<td>£1,200 / £140</td>
<td>1.2%</td>
</tr>
<tr>
<td>L</td>
<td>226-255</td>
<td>£885 / £500</td>
<td>0.2%</td>
<td>226-255</td>
<td>£1,700 / £140</td>
<td>0.2%</td>
</tr>
<tr>
<td>M</td>
<td>Over 255</td>
<td>£1,120 / £515</td>
<td>0.4%</td>
<td>Over 255</td>
<td>£2,000 / £140</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

![Chart 16](image-url)
were announced in the Summer Budget of 2015, and believes they are less encouraging of ultra-low emission vehicles, such as plug-in hybrids and offer no incentive to used car users to choose lower emitting options. As such, the VED changes could work against the incentives available from Government to purchase these vehicles. In addition, the introduction of a £310 surcharge for five years for cars with a showroom price of more than £40,000 will moderate demand for some of the lowest emitting vehicles using innovative technologies such as hydrogen and some plug-in hybrid vehicles given such new technology is invariably expensive. The move could also have a detrimental impact on some of the UK’s premium, luxury and specialist car manufacturers.

If the 2017 rates were applied to the 2016 market then the average vehicle would be subject to a £209 first year fee - almost four times the average £54 they paid in 2016, which would bring over £400 million in additional revenue into government. The impact on particular segments or manufacturers will also be disproportionate.

**COMPANY CAR TAX (CCT)**

Whilst businesses look to minimise costs, Company Car Tax (CCT) helps encourage the company car driver minimise their own tax liability. Since 2002, CCT has been based on CO2 emissions, the vehicle list price, its fuel type and the user’s own tax band. The CO2 bands and rates have changed over time but government has tended to give rates for several years in advance which is extremely useful for company car drivers given they typically have a three year ownership pattern.

In 2010 the government made the welcome move to ensure zero CO2 emitting cars were subject to a 0% rate for five years. However, whereas in 2015/16 cars emitting up to 50g/km faced a 5% rate, this rose to 7% in 2016/17 and will increase again to 16% by 2019/20. The rates are detailed in Table 4 below, noting that diesel cars face a 3% additional rate.

**TABLE 4 | CCT BANDS AND RATES TO 2020**

<table>
<thead>
<tr>
<th>CO2 emission level (g/km)</th>
<th>2015-16</th>
<th>2016-17</th>
<th>2017-18</th>
<th>2018-19</th>
<th>2019-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=50</td>
<td>5%</td>
<td>7%</td>
<td>9%</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td>51-75</td>
<td>9%</td>
<td>11%</td>
<td>13%</td>
<td>16%</td>
<td>19%</td>
</tr>
<tr>
<td>76-94</td>
<td>13%</td>
<td>15%</td>
<td>17%</td>
<td>19%</td>
<td>22%</td>
</tr>
<tr>
<td>95-99</td>
<td>14%</td>
<td>16%</td>
<td>18%</td>
<td>20%</td>
<td>23%</td>
</tr>
<tr>
<td>100-104</td>
<td>15%</td>
<td>17%</td>
<td>19%</td>
<td>21%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Then 1% rise for each 5g/km band up to 37% (note diesels face 3% surcharge)

In the Autumn Statement 2016 the government announced that rates for CCT from April 2020 would be further differentiated for ultra-low emitting vehicles (classed as below 50g/km). Rates for zero emitters would be set at 2% and rates for 1-50g/km emitters would vary by between 2-14% depending on the number of zero-emission miles the vehicle could travel (see Table 5 for details). For every five grams above 50g/km the rate will increase by 1% until 165g/km when the maximum 37% rate will apply (40% if a diesel).

**TABLE 5 | CCT BANDS AND RATES, 2020**

<table>
<thead>
<tr>
<th>CO2 emission level (g/km)</th>
<th>Zero emission range</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>1 – 50</td>
<td>130 miles and greater</td>
<td>2%</td>
</tr>
<tr>
<td>1 – 50</td>
<td>70 – 129 miles</td>
<td>5%</td>
</tr>
<tr>
<td>1 – 50</td>
<td>40 – 69 miles</td>
<td>8%</td>
</tr>
<tr>
<td>1 – 50</td>
<td>30 – 39 miles</td>
<td>12%</td>
</tr>
<tr>
<td>1 – 50</td>
<td>Lower than 30 miles</td>
<td>14%</td>
</tr>
</tbody>
</table>

**CAPITAL ALLOWANCES (CA)**

Capital allowances (CA) are a cost relief for business investment against taxable profits. They have been referenced against a car’s CO2 emissions since 2009 and help provide an incentive to persuade fleet buyers to consider low-emitting products. The current rates provide a 100% first year allowance if the car emits 95g/km CO2 or less, then 18% if CO2 emissions are between 96-130g/km and 8% for those over 130g/km. From 2018, the first year allowance threshold rate will be cut to 50g/km and the main rate to 110g/km.

In the Autumn Statement 2016, the Government announced that until the end of March 2019 (from 23 November 2016) 100% first-year allowances will also be available to companies investing in charge-points for electric vehicles.

**SALARY SACRIFICE**

In 2016 the Government made announcements around the tax treatment of employee benefits, including salary sacrifice. Employees who forego cash salary for benefits will pay the same tax as the vast majority of individuals who buy those same benefits out of their post-tax income, with tax and employer National Insurance advantages of salary sacrifice schemes to be removed from April 2017. However, arrangements for ultra-low emission cars (defined as vehicles under 75g/km of CO2) have been excluded from these changes and arrangements in place before April 2017 will be protected until April 2018, with arrangements for cars protected until April 2021.

**FUEL DUTY**

Fuel costs are an important factor in the overall running costs of a vehicle. In the past, the Government had in place a fuel duty escalator to encourage purchase of more efficient vehicles and to encourage consumers to drive more efficiently. Since 2011, however, duty rate rises have consistently been postponed as the government looks to minimise their inflationary impact on the economy and help competitiveness. UK pump prices have fallen in recent years (see chart 17), as oil prices have fallen, although they have been rising in recent months given the exchange rate impact. Lower fuel prices would tend to diminish consumer appetite for more efficient vehicles, and so low CO2 emitting vehicles. The main fuel duty rates for petrol and diesel remain at 57.95 pence per litre. Many other European countries have different rates for petrol and diesel, with a lower rate for diesel, which has resulted in diesel share in other member states being above the UK’s.
The initial higher purchase cost of pure electric, plug-in or hydrogen vehicles has been recognised as one of the major barriers to their take-up. To tackle this, the government introduced the PiCG in January 2011. The PiCG initially gave consumers 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). From 1 March 2016 the incentives were lowered and differentiated by zero-emission capable range (see Table 6). In 2016, some 35,000 new registrations were made through the scheme, up more than 30% on the previous year.

<table>
<thead>
<tr>
<th>Category</th>
<th>CO₂ requirement</th>
<th>Zero emission range</th>
<th>Grant (as % cost)</th>
<th>Maximum grant</th>
<th>Number models eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car – category 1</td>
<td>Under 50g/km</td>
<td>At least 70 miles</td>
<td>35%</td>
<td>£4,500</td>
<td>19</td>
</tr>
<tr>
<td>Car – category 2*</td>
<td>Under 50g/km</td>
<td>10-69 miles</td>
<td>35%</td>
<td>£2,500</td>
<td>15</td>
</tr>
<tr>
<td>Car – category 3*</td>
<td>50-75g/km</td>
<td>At least 20 miles</td>
<td>35%</td>
<td>£2,500</td>
<td>1</td>
</tr>
<tr>
<td>Van</td>
<td>Under 75g/km</td>
<td>At least 10 miles</td>
<td>20%</td>
<td>£20,000</td>
<td>9</td>
</tr>
</tbody>
</table>

*Recommended retail price must be under £60,000

The PiCG is part of the government’s commitment to invest £600 million in ULEVs by 2020. To date some 85,000 pure-EV and plug-in hybrid electric vehicles have been registered in the UK. Government is set to review the PiCG in 2017. Given the early nature of this market, industry looks to continuous support to help further growth.

**GO ULTRA LOW (GUL)**

To help promote the uptake of electric vehicles government and several vehicle manufacturers set up a joint consumer communications campaign which aims to promote the benefits, cost savings and capabilities of pure-EVs and PHEVs. In 2016 seven vehicle manufacturers supporting the campaign are: Audi, BMW, Kia, Nissan, Renault, Toyota and Volkswagen. See www.goultralow.com for more details.

Go Ultra Low (GUL) expects some 30 new plug-in vehicles to enter the market over the next three years. The campaign has been strengthened by manufacturers such as VW committing to having a plug-in version of each of their models by 2020. GUL was encouraged by the on-going growth in electric vehicle registrations in 2016, as more and more motorists realised the cost saving and environmental benefits of driving a plug-in electric car. With ongoing government incentives and increasing product choice it expects this trend to continue, boosting the total number of electric cars on UK roads beyond 100,000 by mid-2017.

GUL is also looking to target company car drivers to switch to electric vehicles. GUL undertook a survey in 2016 and concluded that 69% of company car drivers would be likely to ‘go electric’ if companies offered plug-in vehicles. GUL has introduced the ‘Go Ultra Low Companies’ initiative to recognise and reward public and private sector organisations that offer EVs as company cars to employees.

**LONDON CONGESTION CHARGE**

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 Congestion Charge, where ULEVs (vehicles emitting <75g/km of CO₂) are exempt from the £11.50 per day charge.

There has been increased speculation, discussion and consultation around the possibility of introducing charges based on air-quality – such as the emissions surcharge in London (£10 for pre-Euro 4 cars – circa pre 2005). While such measures might encourage the uptake of newer and lower CO₂ emitting cars, industry is concerned that they could be overtly anti-diesel, have a minimal impact on air quality and create a confusing patchwork of measures across the country if not implemented appropriately.

**UK AND EU AVERAGE NEW CAR CO₂ EMISSIONS CONVERGED OVER TIME**

The average new car CO₂ emissions fell slightly faster in the EU, at 3.1%, than the 2.6% decline in UK in 2015 (latest year available), marking a reversal of the long term trend to convergence. The UK had average new car CO₂ emissions 1.4% above the EU’s 119.6g/km, at 121.3g/km (figures sourced from EEA, latest updates typically released in April). Since 2000 (and 2007) the UK has recorded a higher rate of improvement than in the EU as whole – at 34.6% compared with 30.5% (and 26.4% vs 24.6% respectively since 2007).

The difference between the UK and EU figures is largely due to different market structures – noting the UK has a higher average GDP per head and tends to have preference for larger, more powerful vehicles that many other European markets. At the same time, the UK also tends to have an above average level of alternatively fuelled vehicles. The latest figures from ACEA (www.acea.be) show that in 2016, the UK had the largest market for pure electric and plug-in hybrid vehicles in Europe, having grown
28.6%, while the Dutch market shrank by 48.7%. The UK also had the highest number of new hybrid registrations, with the market having grown by 18% to surpass France. However, our less favourable diesel fuel duty rates mean the UK does tend to have a lower than average diesel penetration. (Diesel duty is lower than petrol in most EU markets, whilst it is the same in the UK.)

In 2015 the Netherlands once again recorded the lowest average new car CO\textsubscript{2} emissions of any member state in 2015, at 101.2g/km. This was 16.6% below the UK’s. The Netherlands and UK had similar CO\textsubscript{2} levels in 2007, but since then the Dutch have introduced high CO\textsubscript{2}-based taxes and offered large incentives for zero emission capable vehicles. These measures helped Holland achieve the largest market for pure EV/PHEVs for a second successive year in 2015, but as these measures were negatively adjusted in 2016, the pure E/PHEV (notably PHEV) market fell sharply, by 48.7% and their average fleet CO\textsubscript{2} emissions increased. The UK was ranked 13th lowest in average new car CO\textsubscript{2} emissions for a second successive year in 2015. Compared with the two other key European markets, Germany and France, the UK sat broadly in the middle – with France at 111.0g/km and Germany 128.4g/km.

The impact of the vote to leave the EU will have implications on the monitoring and reporting of UK CO\textsubscript{2} emissions, and the role the UK plays in the overall pan-EU new car (and LCV) CO\textsubscript{2} Regulation. This issue is discussed further in the outlook section.
AVERAGE NEW LCV CO₂ EMISSIONS IN 2016 FALL BELOW 2017 PAN-EU TARGET LEVEL

Average new light commercial (LCV) CO₂ emissions fell 1.9% to a new low of 173.7g/km in 2016. This was 0.7% below the pan-European target of 175g/km by 2017, as set out by EU Regulation EC 510/2011. The rate of progress edged down a little from 2015’s 3% reduction, but was still a credible 12.4% below the 2011 estimate of 198.4g/km (SMMT’s first data estimate). Average emissions fell in each of the seven key sectors’ SMMT reported on (see Chart 23), but the overall rate of progress was once again tempered by the shift towards larger more versatile van types, which, on average, are higher CO₂ emitting (see Chart 24). Despite meeting the 2017 target early, to match the 147g/km pan-EU target for 2020 will require a significant pick-up in the rate of progress – to 4.1% per annum - in order to deliver a net 15.4% reduction in four years.

CO₂ EMISSIONS FROM ALL VANS IN USE INCREASING, AS VAN USE RISES RAPIDLY

With increased economic growth, and in particular internet shopping and local deliveries, more small businesses, downsizing from heavier trucks and attractive finance options, the UK van sector has shown strong growth. The LCV market has doubled in volume since 2009, to 374,093 units. Meanwhile, the parc (vehicle fleet) has grown from 3.5 million units in 2007 to over 4 million in 2016. Similarly, vehicle use has increased, rising by 47.2% between 2000 and 2015. CO₂ emissions from LCVs have risen by 26.2% since 2000, including growth in each of the past five years to 2015, reflecting the rapid growth in van use.

MARKET SHIFT TO LARGER VANS CONTINUES

The van market is very different to the car market. Vans are bought by businesses to do a job. As such, they are more functional and largely bought based on size and load capacity. Operating costs over a vehicle’s working life are minimised, so running costs such as fuel efficiency are important. Almost all vans are diesel-fuelled, barring a handful of alternatively fuelled vehicles. Generally, the larger the van, the higher the CO₂ emissions, although on a ‘per tonne transported’ basis the performance maybe very different. Chart 23 shows CO₂ performance by LCV type, while Chart 24 (see page 17) shows the market shift to larger vehicles. In 2016, the growth in the 2.8 tonne and above segments was particularly evident, while demand for smaller vans, especially below 2 tonnes (the lowest average CO₂ segment) fell. The 2.8-3.5 tonne segment rose by 14.2% in 2016 to become the largest, representing 26.9% of the market, closely followed by the 3.5 tonne segment, accounting for 25.4%. The light 4x4 segment, which has CO₂ emissions that are on average 47.4% above the market average, reported a 59.7% drop in registrations in 2016.

Alternatively fuelled vans still represented fewer than 1,000 new registrations in 2016, but did increase by 17.3% to take a 0.3% share of the market (up from 0.2% in 2015). The Nissan NV200 accounted for more than 80% of these registrations, while French manufacturers Citroën, Peugeot and Renault made up the remainder. It is expected that new models will flow into the market in 2017, while there will also be trials of a plug-in electric hybrid version of the overall LCV market’s best-seller, the Ford Transit.
HEAVY COMMERCIAL VEHICLES (HCVS)

Heavy commercial vehicles (HCVs) accounted for 4.8% of all CO2 emissions in the UK in 2015, recording a 4.4% rise in 2015 to 19.3Mt CO2, a level almost unchanged since 2000. HCVs are business tools, used to transport goods around the country. On a European basis they carry more than 75% of all land-based freight and are crucial for the economic well-being and functional operation of modern society.

Because of the vast array of different types of HCVs – rigids and artics, 2, 3 or 4 axle variants, flat-beds or high-sided vehicles - adopting a similar approach to cars or vans to record and monitor the CO2 performance of the vehicles is difficult. A ‘one-size’ fits all approach is too simplistic for such a complex market. In addition, the same ‘tractor’ unit can pull different types of trailers and with different loads, shapes and sizes. This further complicates assessing the CO2 performance of the fleet.

Industry, along with the European Commission, has been working on a tool to simulate CO2 emissions from a wide variety of complete truck and trailer configurations to enable consumers to compare different vehicles’ CO2 and fuel efficiency in a standardised way. This tool is called VECTO (Vehicle Energy Consumption Calculation Tool). Forthcoming EU legislation will require each truck to have a CO2 valued declared on its type approval certificate. This data will then be matched to registrations across the EU to help monitor the CO2 profile of the new vehicle market.

The collection of this data will help assess whether CO2 targets or standards are of value in the HCV sector. The metric of CO2/fuel efficiency will also be an important discussion topic. While per person measurements for public sector vehicles (such as buses and coaches) are well established, for HCVs the tonne/km or volume/km debate is still on-going. SMMT would also like consideration of pallet/km to be explored, noting that in the UK we have double-deck trailers, which would be penalised by use of a tonne/km basis.

SMMT would welcome a more comprehensive approach being taken to vehicle CO2 emissions, looking at all vehicles in the fleet and how all stakeholders can influence their environmental performance.

Below is a list of possible measures which could be reviewed and assessed to help improve the fleet’s CO2/fuel efficiency.

- Enable longer and heavier HCVs to be used – for example the European Modular System (EMS) should be adopted EU-wide.
- Enhance the use of Intelligent Transport Systems/telematics/connected and autonomous vehicle technologies. This could help vehicles operate more efficiently and reduce journey distances and times, bringing environmental benefits.
- Enable platooning – with harmonised rules across the EU
- Greater support for alternatively fuelled vehicles (AFVs) – including infrastructure provision and additional weight (and space). (AFVs may be heavier and so may fall into different vehicle classes).
- Incentivise fleet renewal to ensure the most efficient (and safe) vehicles are in operation. This could be linked to AFV support.
- Vehicle taxation could be better used to encourage purchase and use of more efficient vehicles. A more harmonised approach across the EU would better ensure a more level playing field.
- Enhance road infrastructure – including better/intelligent road signage and low rolling resistance roads
- Encourage more driver training, for example eco-driving.

It will be important to ensure that emissions from the HCV sector are properly addressed, but also that the road transport sector remains competitive and costs are not merely inflationary or the measures used to merely push business onto other modes of transport which may be less efficient or less competitive. The role of public procurement should not be under-estimated either.

BUSES AND COACHES

The UK bus and coach market has already seen the emergence of a variety of lower-carbon technologies – notably hybrid, pure electric, biofuels and hydrogen. Efficient diesels, using mild-hybrid systems for the ancillaries (rather than to drive the vehicle) can also be effective in reducing the overall emissions associated with bus use. Most buses run on prescribed routes in urban areas and with dedicated depots, they more easily lend themselves to using alternative fuels than many other vehicle types. For coaches, which tend to cover longer distances and more varied routes, the opportunities for full electrification might be more limited.

Besides a shift to lower carbon models, buses and coaches also offer an opportunity for modal shift. Unlike cars and vans, buses and coaches do not face tailpipe CO2 regulations but are often regulated by the local authority or city which has appointed an operator to a route requiring the vehicle to meet certain standards, including those relating to the environment. It is important that these policies pull in a common direction rather than create a patchwork of differing requirements, which make it difficult for manufacturers and operators to plan and bring to market effective solutions. Broader policy considerations, including better planning and suitable infrastructure provision, could also help ensure modal and technological shift can be delivered.
Overall UK CO₂ emissions have fallen by 27.3% since 2000 to 404MtCO₂e in 2015, including a 4.1% drop since 2014. The performance in part reflects a move from coal to gas in electricity generation and closure of some manufacturing businesses (notably steelworks in 2015).

Road transport has become one of, if not, the largest source of CO₂ emissions as emissions in other areas, notably energy supply, have fallen. Although emissions from road transport have been cut since 2000, albeit by a modest 3.5%, they have risen in each of the past two years. The recent uplift in emissions corresponds to a rise in vehicle use, which has begun to offset the improvements in new vehicle efficiency. This has put an increased focus on the role of transport in meeting the UK’s emissions reductions targets. Emissions from all cars in use have fallen by 8.9% since 2000, but they rose in 2015. The growth in emissions from vans has been particularly evident.

**FLEET RENEWAL**

A new car is more than 20% more efficient than the average car in use - in 2015 the average car in use emitted 153.0g/km, compared with 121.4g/km for a new car (a 20.7% difference). If a car leaving the fleet (for example being scrapped), is assumed to be 14 years old, then a new car is almost a third more efficient.

A new car will also offer the consumer increased information to help improve emissions in use, for example gear shift indicators, trip computers and sat navs (helping reduce distance travelled through optimising route guidance and avoiding congestion). New cars are lower emitting, safer, more reliable and more desirable than their older counterparts.

In 2015, new cars only represented around 8% of the 33.5 million cars in use. It is also a concern that the average age of the car in use has increased in recent years, from 6.8 years to 7.8 years over the past decade, which will be to the detriment of the environmental profile of the fleet.

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There are a number of fleet CO₂ emissions influencers, some of which are set out in the diagram below. The impact of some of these stakeholders, notably government and fiscal measures are detailed further in this report. Action can be taken on a broad number of measures to help reduce emissions. This could include measures to reduce the need to travel at all such as using electronic communications, choosing the right mode of transport and, ensuring
vehicles are well-maintained and well driven. A poorly maintained vehicle can emit as much as 50% more CO₂, while eco-driving techniques can reduce emissions by 5-15%.

**DIAGRAM 1 | TACKLING FLEET CO₂ EMISSIONS – STAKEHOLDERS AND THEIR ROLES**

- **Auto Industry**
  - Technological progress
  - Driver aids
  - Information

- **Government and Regulators**
  - Regulations
  - Fiscal measures
  - Infrastructure
  - Information

- **Consumers**
  - Journey/modal/vehicle choice
  - Driving style
  - Vehicle maintenance

- **Others**
  - Media – info/advice
  - Local Authorities
    - parking rules, congestion or clean air zones
INDUSTRY COMMITTED TO REDUCING CO₂ AND IMPROVING AIR QUALITY IN PARALLEL

The automotive industry has invested billions of pounds to reduce pollutants such as oxides of nitrogen (NOx) and particulate matter (PM), as well as tackling CO₂ emissions. Air quality pollutants impact at a local level, whereas CO₂ is a global issue. Industry takes tackling all of these emissions very seriously and looks to the latest Euro standards (see below for more detail) and the introduction of the Real Driving Emissions (RDE) test to deliver on air quality and help ensure confidence in the environmental performance of new vehicles.

National figures, published by the Department for Transport shows NOx and PM2.5 emissions from road transport and, in particular, cars, fell between 2000 and 2014 (see chart 28). In 2014, road transport accounted for 31.6% of all NOx emissions, with cars accounting for 15.7%. For PM2.5 the figures were 13.6% and 3% respectively. Since 2000, NOx emissions from cars have fallen by 62.8% and PM2.5 emissions by 52.7%. However, at a local level concerns may be much more acute and the need for action more pronounced.

These pollutant emissions are regulated by tailpipe ‘Euro’ standards, which set maximum levels that a vehicle can emit. Vehicles are tested in a laboratory with the precise measuring equipment needed for detecting the required level of emissions. A new Real Driving Emissions (RDE) test will apply from 1 September 2017 for new models, which will ensure any given vehicle in use remains in compliance with the laboratory limits when tested on the road. The recent development of PEMS (Portable emissions measurement system) testing technology enables the RDE test to be undertaken but PEMS equipment is not yet as accurate as the laboratory equipment. This is why at the final stage of implementation of RDE, known as Step 2, there is a conformity factor of 1 (i.e. the emissions measured from the vehicle on the road must meet the same limits as when measured in the laboratory) but there is a factor allowed for equipment inaccuracy. This is currently specified at 0.5, but will be reviewed on an annual basis as the equipment is developed.

Chart 29 shows the Euro standards for NOx applying to diesel cars since Euro 3 (2000-2004). The chart shows how the standards have become increasingly strict through to the latest introduction of Euro 6 from 2015, which mandates that the NOx limit for a Euro 6 diesel car is 84% lower than for a Euro 3 car. The chart also shows the levels that will be permissible when measured under RDE conditions. Data from the International Council on Clean Transport (ICCT) using a PEMS test shows the ‘real world’ performance of a Euro 3, 4 and 5 diesel car. The RDE test should help restore confidence that emission standards will be achieved in both the laboratory and on the road. Unless new vehicles meet these tests they cannot be type approved and therefore put on sale.

Under the latest Euro 6 standards, the NOx emissions of a petrol and diesel car are at their lowest ever levels and are approaching parity - 60mg/km for petrol and 80mg/km for diesel (limits for previous Euro 5 diesel were 180mg/km). This should help reduce concerns over the air quality impact of new diesel cars. New diesel cars should not, therefore, be unduly discriminated against through regulations, standards or policies, nor should they be priced out of the market. This will help ensure that diesels can continue to contribute to CO₂ emissions reduction. It would also safeguard the UK’s (and Europe’s) position as a key developer and manufacturer of diesel technologies. Diesels still play an important role for the right user, notably those travelling long distances, or with heavy loads. Converting such users to petrol may not improve urban air-quality (eg as long distance diesel drivers often use motorways which are not typically in urban areas) but would have an adverse impact on CO₂ performance.
INTRODUCTION
The outlook for new car CO₂ emissions will be, as ever, dependent upon a number of different stakeholders and factors. Automotive manufacturers will be looking to bring to market ever more competitive products and working towards achieving the 2020 pan-European CO₂ targets. At the same time, consumers want safe, efficient vehicles to minimise running costs but are also looking for more space, functionality and comfort, all at an affordable price. Regulators and government, meanwhile, have to balance health and environmental targets with revenues from motorists and a desire to support and grow industry, providing jobs and creating wealth for the nation. There are also many other stakeholders and media influences which shape the type of vehicles bought and used in the UK.

Industry advocates a comprehensive approach, looking at the broader influences on fleet emissions beyond just new vehicles, to enable all stakeholders to work together to understand individual impacts and how they interact. Pulling in a common direction will achieve the best results and least cost to society.

The EU has set out tailpipe CO₂ targets for cars and vans to 2020/21 and is expected to produce a draft proposal for post 2020 in 2017. At the same time, the way CO₂ emissions are measured will change with the introduction of the WLTP emissions test procedure later this year. While this will not impact on the actual emissions of the vehicle, it will have knock on implications for industry, consumer information and taxation measures. The vote to leave the EU also gives the UK an opportunity to consider whether to continue to align with the EU approach or adopt something different. 2017 will be the starting point for some of these issues and it could take several years for the impacts and policies/regulations to evolve.

A list of some of the issues which could influence CO₂ performance over the next few years is shown below. To note, some of these are potentially conflicting and could offer the possibility for making CO₂ reduction easier or harder to achieve, depending upon how they play out.

DIAGRAM 2 | INFLUENCES AHEAD ON CO₂ PERFORMANCE

| Balancing air quality and CO₂ |
| Competition |
| CO₂ targets |
| Cost, convenience and performance of new technology |
| Consumer appetite for larger vehicles |
| ULEV/EV uptake and infrastructure |
| Consumer demand for efficiency/low cost |
| Brexit |

LEVEL OF AMBITION
In 2016 the UK signed up to the 5th Carbon Budget, as proposed by the Committee on Climate Change. This set out a legally binding commitment to deliver a 57% cut in carbon emissions by 2030, from a 1990 base. This is above the EU’s ambition to deliver a 40% reduction over the same period. The UK also has a longer term target, set out in the Climate Change Act, to reduce national CO₂ emissions by at least 80% by 2050. These give the UK some of the most ambitious targets in the world. The government is currently working on a new emissions reduction plan to set out how it will deliver these targets.

EU NEW CAR AND VAN CO₂ REGULATION
The UK does not have specific emissions targets for cars or a new car CO₂ fleet average target because it is currently part of the pan-European New Car CO₂ Regulation (EC 443/2009). This is the cornerstone of the EU’s strategy to improve vehicle efficiency and is part of its target to reduce greenhouse gas emissions by 20% by 2020 (from 1990 level). It sets a tailpipe target for new cars in the EU to emit not more than an average 95g/km in 2021 (with a phase-in of 95% of the fleet achieving this target in 2020). The 2021 target represents a 40% reduction from the 2007 level of 158.7g/km. There are significant penalties for companies that miss their targets (at €95g/km per gram CO₂ over target, multiplied by number of vehicle registrations). There is also a regulation for new vans (EC 510/2011), which sets out fleet average targets of 175g/km by 2017 and 147g/km by 2020.

The Commission held a public consultation in the second half of 2016 on the post 2020 new car and van CO₂ Regulations, largely around the design of the scheme, rather than the level of ambition. SMMT’s views on the post 2020 regulation are set out below. The SMMT’s views are broadly aligned with those of ACEA (the European vehicle manufacturers association) and CLEPA (the European automotive components manufacturers association).

SMMT POSITION ON THE POST 2020 NEW CAR CO₂ REGULATION

- There should be an appropriate level of ambition and scientific approach to ensure industry has meaningful but deliverable targets. Targets should be based on the new WLTP measure and be fair reflection of the impact on tailpipe numbers from the change in the test procedure. Note that while the EC consultation gave no indication on level of ambition, a 2014 impact assessment it produced ahead of the Paris negotiations, ‘ambitious and very ambitious’ policy measures specified 70g/km for cars and 110g/km for LCVs in 2030. (All figures expressed under NEDC.)

- Targets should be expressed as a percentage reduction. This would enable them to be comparable with the EU’s overall level of ambition for CO₂ and ensure comparability with other sectors. The metric should remain gCO₂/km and use mass as a parameter. In addition, at this stage, the tank-to-wheel approach should be maintained, rather than introducing a more complex well-to-wheel or life-cycle analysis approach.

- The target should be set for 2030, to give industry sufficient
time to develop and implement technological change and be in keeping with the timelines adopted in the regulation to 2020.

- The target should be conditional, for example, based on measures such as market uptake of AFVs and infrastructure provision. There should be a mid-term review in 2025 to consider these points and ensure the level of ambition is still realistic.

- Modalities should be put in place to complement the 2030 target, for example a focus on ITS applications, off-cycle credits and super-credits or similar.

- There should be no zero, or low, emission vehicle mandate for the new car market, as some stakeholders have suggested. Rather, SMMT calls for a technology neutral approach to provide manufacturers with flexibility to deliver a broad array of products, which might be better suited to the needs of particular consumers, rather than pushing industry down a particular technology route.

- Measures that ensure small volume and niche manufacturers have targets appropriate to their economic and technical potential should be maintained. This would allow smaller businesses to enter, grow and bring diversity to the market.

**IMPACT OF BREXIT**

The UK’s decision to leave the EU will necessitate - at some stage - an analysis of the UK contribution towards the New Car CO2 Regulation. This will be part of a wider assessment of the UK’s regulatory framework and its ongoing relationship with EU legislation which governs, in automotive terms, the UK’s biggest export market. While understanding that decisions on one individual regulation may part of a wider package of measures and be subject to broader political decisions, the automotive industry is keen to ensure - as a point of principle - regulatory harmonisation with Europe. This is one of the main objectives for the UK automotive industry as the UK seeks to renegotiate its relationship with the EU. Whilst the threat of tariffs and non-tariff barriers, arising from exclusion form the customs union, might be foremost in Governmental minds, the regulatory issues should not be overlooked. Industry will look to Government to minimise any market distortions that might result from leaving the EU.

The UK was the second largest new car market in the EU in 2016 and represented 18.4% of the total market. Removing the UK from the EU’s CO2 fleet performance monitoring and reporting would reduce manufacturers’ flexibility in meeting targets by reducing the size of the market available to them to sell lower-emitting vehicles into. It is worth noting in mind that the UK is a generally more affluent market than many other EU markets, able to embrace newer, more expensive technology more readily than many others. That said, whilst some might advocate a UK-specific target, this would leave manufacturers with a more limited market within which to manage product offerings and would increase their susceptibility to market trends. Moves to split the UK from the EU targets would also necessitate a re-baselining of the EU and any UK targets, given the mass parameters in the Regulation. The level of ambition and incentives/packages in place to encourage take up of lower CO2 emitting vehicles in the different markets would also be important drivers for manufacturers determining where to sell particular products. The UK automotive industry is therefore considering its position on CO2 regulations, post-Brexit, taking into account the above considerations, alongside an uncertain regulatory framework. There may be some merit in maintaining the Regulation until the end of the current target periods (2021 for cars and 2020 for vans) to ensure minimal disruption for all parties but this must be balanced against the UK’s own environmental and political objectives.

**MOVE TO WLTP**

The introduction of the WLTP emissions test cycle will provide consumers with a figure that better reflects current driving cycles. It will provide industry and stakeholders a new opportunity to re-engage with consumers and help re-focus them on the importance of making informed purchasing choices. Because the WLTP figure will eventually be used for advertising, the new car label and taxation purposes, the messaging and timing of its
OUTLOOK FOR NEW CAR CO₂ EMISSIONS

The importance of diesels in delivering carbon emissions reductions is also important. As outlined earlier in the report, diesels can emit 20% lower CO₂ than equivalent powered petrol-fuelled vehicles. Therefore, measures that moderate diesel uptake could have implications for CO₂ targets. Industry is increasingly concerned that new diesels will be subject to punitive penalties in pursuit of a justifiable need to improve air quality but which may have unintended consequences.

Balancing urban air quality and CO₂ emissions is important. Air quality standards are covered by Euro standards, which set limits on the amount of NOx and PM (as well as other pollutants) a vehicle can emit. The move to the Euro 6 standard and the introduction of Real Driving Emissions (RDE) testing should ensure the impact on air quality, from new cars at least, is minimised, allowing policy measures to re-focus on CO₂. 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. The cost of engineering vehicles to meet this standard is significant and will shape product planning.

The focus on connected and autonomous vehicles (CAVs) could also have a positive impact on CO₂ emissions. As vehicles communicate with each other there is the potential to reduce accidents congestion and whilst minimising human input could help the vehicle run at its optimum, thus reducing emissions.

Vehicle manufacturers are increasingly looking at car clubs and car sharing schemes to ensure consumers have access to a desired vehicle when needed, without requiring full-time ownership with its implicit costs. This should ensure vehicles are used more effectively and could also give drivers access to the latest technologies more quickly. Trends to urbanisation and consumer preference for ‘mobility solutions’ rather than vehicle ownership could see significant changes to the traditional business model of selling new vehicles. SMMT’s response to the EC's consultation on post-2020 CO₂ Regulation suggested additional merit should be given to manufacturers which actively support car clubs or efficient driver training, reflecting the additional CO₂ savings these could deliver.

GOVERNMENT SUPPORT FOR LOWER CO₂ EMITTING VEHICLES

The UK government has been very supportive of the move to lower emitting vehicles, through early adoption of CO₂-based taxes (eg Vehicle Excise Duty (VED) and Company Car Tax (CCT)), as well as consumer incentives such as the Plug-in Car Grant, promoting low emission vehicles via the Go Ultra Low campaign and providing money for R&D to help the UK be at the forefront of new technologies. Recent changes to VED, however, are an example of where environmental and fiscal policies are unaligned and this should be avoided in future.

In 2016 the government announced a further £90 million to be invested in ULEVs and CAVs by 2020-21, as well as £40 million additional funding for the Plug-in Car Grant, £80 million for ULEV charging infrastructure, £150 million in support for low emission buses and taxis, £20 million for the development of alternative aviation and heavy goods vehicle fuels and £100 million for new UK CAV testing infrastructure.

Provision of effective and convenient infrastructure will help...
OUTLOOK FOR NEW CAR CO₂ EMISSIONS

increase uptake of pure electric and hydrogen vehicles. Hydrogen re-refuelling stations will be necessary to enable motorists to refuel and will require considerable strategic planning. While much of the pure electric vehicle charging will be done at home or at the workplace, provision and location of rapid chargers can help allay any fears, perceived or otherwise, about need for public charge-points. The importance of local authorities to support the provision of on-street charging will also be important to realising national ambitions for uptake of zero-emission capable vehicles. Industry would welcome joined up engagement to help deliver this infrastructure. It is also important that these, and other, measures do not undermine the residual values of pure electric and hydrogen vehicles, especially as residual values play values play such an important role in finance and leasing arrangements.

The 2017 Vehicle Technology and Aviation Bill (formerly called the Modern Transport Bill) provides the government powers to help with electric vehicle infrastructure. This includes data on charge point locations and availability, set minimum technical specifications for charge point connectors, oblige charge point network operators to allow interoperability between networks, mandate EV infrastructure at motorway service areas and large fuel retailers and require that charge points are ‘smart’ and can interact with the electricity grid.

Industry remains concerned that forthcoming changes to the VED and CCT regimes will diminish the incentive for new plug-in electric vehicles, while the 2017 VED changes also remove the incentive for used car buyers. Given the early the early nature of the ULEV market, continued long-term support and signals are still necessary to encourage market transformation. It is also confusing that the VED and CCT bands do not have any consistency between them on the CO₂ bands.

MARKET TRANSFORMATION REQUIRES A COMPREHENSIVE APPROACH

New cars only represent around 8% of all cars in use and therefore have a comparatively small impact on total road transport emissions, so tackling emissions from all cars, as well as other vehicles, including vans, lorries, buses and coaches, is key.

The comprehensive approach seeks to reduce CO₂ emissions by drawing on a broader array of solutions than new cars alone. This would still include the vehicle itself, but also faster fleet renewal, intelligent transport systems (ITS), improving infrastructure, decarbonising fuels and altering driver behaviour. These changes go beyond just the role of the automotive industry, requiring engagement with a broader range of stakeholders, including fuel suppliers, government and policy makers, media and consumers.


BIOFUELS

Biofuels, which include ethanol, biodiesel and natural gas, can help reduce CO₂ by replacing fossil fuels with those derived directly from plants or indirectly from agricultural, commercial, domestic, and/or industrial wastes. Biofuels can also reduce some other pollutant emissions, notably particulate matters.

Currently petrol and diesel sold in the UK already contain biofuels, E5 allows for up to 5% of petrol to be made up of ethanol and B7 allows for up to 7% of diesel fuel to be biodiesel. The UK is also looking to introduce E10, and most petrol cars are designed to run on this level of fuel (provided it meets the appropriate BSI standards). It is important that the fuel quality is correct, to avoid any issues which impede the normal operation of the vehicle and tarnish the image of biofuels. The higher use of biofuels could help reduce emissions from the vehicle fleet. However, the source of the biofuel is important to sustainability and the broader environmental issues.
CONCLUSION

The UK has made excellent progress in reducing average new car CO₂ emissions, cutting them by almost a third since 2000. Technology gains have been evident in internal combustion engine vehicles as well as the introduction and deployment of alternatively-fuelled vehicles. At the same time vehicles have been designed to meet ever stricter air-quality standards whilst satisfying consumer demand for more spacious and luxurious products. All the while maintaining affordability in an ever more competitive market.

2016 did see a more modest reduction in new car CO₂ emissions than in previous years, a slowdown reflective of the change in vehicle type – in terms of segment shift and slight reduction in diesel market share. This highlights the challenge of the UK meetings its climate change ambitions and the UK automotive market contributing towards the achievement of the 2021 target – both which would require a notable pick-up in the rate of improvement. The broader introduction of zero and ultra-low emission vehicles with the requisite increase in infrastructure provision will be critical if this target is to be achieved.

2017 will see significant regulatory transformation which will help shape the trajectory of CO₂ performance and the types of vehicles we use. The metric for measuring vehicle emissions will change, new longer-term targets will be developed and potentially competing ambitions for air quality improvement will have to be met. Simultaneously, we will see reforms to vehicle taxation, some of which may be counter-productive. Further, the future regulatory framework post Brexit will present additional challenges and opportunities for industry. Any new measures must be carefully managed and co-operative and engaged thinking by all key stakeholders will be critical to ensuring the market can evolve in a meaningfully way, delivering both CO₂ and air quality objectives, whilst supporting economic growth and the competitiveness of the UK motor industry.