Making Business Sense

The future of motoring taxation

A report for The Society of Motor Manufacturers & Traders (SMMT)

April 2015

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Executive Summary

The Society of Motor Manufacturers (SMMT) commissioned the Centre for Economics and Business Research (Cebr) to consider the future of motoring taxation, focussing primarily on the role of vehicle excise duty (VED) in the fabric of future UK fiscal policies on motoring. We considered the VED regime in light of an analytical framework of strategic agendas in the automotive industry. Often, there are difficulties in addressing and balancing the government's need for fiscal sustainability with international environmental agendas, alongside supporting the interests of automotive manufacturers while also ensuring fairness for all road transport users.

The combined revenue from the two major motoring taxes, VED and fuel duty, has stood at over £30 billion since 2007. In 2013/14, of the total tax take of around £33 billion, VED from all vehicles contributed almost £6 billion of revenue compared with £27 billion from fuel duty (excluding VAT charged on top of fuel duty). As a result, revenues from VED were equivalent to 1.2% of all tax receipts in 2013/14.

It is evident that VED has been a highly effective and successful policy tool both in raising revenues for the government to part-fund transport expenditure, but also in incentivising the uptake of greener, more efficient vehicles across the entire motorparc. Over the last decade, tighter levels of regulation at the European level have forced the UK automotive sector to become more stringent in addressing the levels of CO_2 emitted by its vehicles. The UK has outperformed its European peers, surpassing EU 2015 emission targets two years ahead of time.

A variety of government policies and grant schemes have signalled and incentivised consumers to buy increasingly efficient vehicles, encouraging an uptake of alternatively fuelled vehicles. At present, around two-thirds of new vehicles registered are not liable for VED in the first year. Such behavioural change has assured manufacturers of sustained demand for newer models, encouraging investment in costly research and development.

With the UK economy expanding and manufacturers commercialising new technologies, growth and employment in the automotive industry should continue to flourish. As a result, we anticipate consumer demand for newer, more efficient and alternatively fuelled vehicles will rise. Fortunately, being a key trading partner with Europe, the UK benefits from a rapidly growing export market for newer efficient models in addition to a robust domestic market. As the motorparc continues to expand and the tax base from used and new cars increases, VED revenues will be supported in the short term.

VED has played and will continue to play a prominent role in the overall motoring taxation model in the UK. Whilst lower CO_2 emissions and increased vehicle efficiency are undoubtedly a positive result, over the longer term, it presents a challenge for the government in the form of an unsustainable revenue base. With the advent and uptake of new technologies, consumers are expected to shift away from conventional petrol and diesel fuelled vehicles, also impacting upon future fuel duty revenues.

While recent history reveals relatively stable VED receipts, our medium-term forecasts suggest that VED receipts from cars will begin to fall in both nominal terms and as a percentage of GDP from 2015/16 onwards. Our central forecast, which is based on recent rates of reduction in average CO_2 emissions and the UK marginally meeting the 2020 EU target of 95 g/km, would see revenue fall from over £5.7 billion in 2013 to around £4.4 billion in 2025, even with VED rates revalorised by RPI inflation each year.

This implies that receipts would fall from their 2013 level of 0.33% of GDP to just 0.16% of GDP in 2025. Based on the current system, our central forecasts suggest that by 2025, nearly three quarters of all new cars would be exempt from VED payments altogether, placing continued pressure on VED revenues in the years beyond our forecast horizon.

Positively, VED is not the only instrument available in the government's toolbox. Motoring policies such as the London congestion charge, Ultra-Low Emissions Zone charging, company car taxes, capital allowances, workplace parking levies, plug-in grants for cars and vans as well as regulation and changing vehicle testing procedures will continue to be used in conjunction with VED. This will enable the funding of shortfalls for government in addition to tackling a host of associated issues such as congestion, deterioration in air quality and localised road transport pressures.

Looking ahead, it is fundamental to ensure that the elements of VED policy that have proven to be beneficial are retained. For instance, the use of one instrument (VED) to tackle one issue (CO_2 emissions) has been highly successful, not just domestically but in a European context. The key principles of simplicity, fairness, certainty and proportionality of VED policy should also be maintained in future years.

However, while manufacturers are sympathetic to the need for change, many advocate modest change rather than an overhaul of the entire motoring tax system. Often, advanced notice and gradual phasing of new policies over longer periods is desirable to allow manufacturers time to adjust production, while also ensuring near term continuity for consumer purchases.

We recommend a gradual evolution of VED bandings for cars, particularly segmentation of the current top band A (as seen in the company car tax system). This would enable the government to maintain the proportionate size of the tax base and the effective average tax rate per vehicle while still allowing for incentives for consumers such as zero VED rates on most efficient cars.

Our modelling forecasts suggest that extending the tax base to include all cars with CO_2 emissions of 50 g/km or above would more than maintain the current tax base in 2025. This would reduce the average real increase in rates required to maintain revenues from VED in real terms to £67 by 2025.

We also recommend sustaining the current "showroom tax" – a higher rate in the first year would be a reliable tool in influencing consumer choices, particularly if they were introduced on currently uncharged bands such as B, C and D over time. Importantly, forward guidance on changes to VED with signposting and a phasing of policies would allow manufacturers time to factor reforms into their longer term business and strategy plans.

Similarly, in the light commercial vehicles market, our recommendation of a new system which graduates vehicles by their CO_2 emissions per tonne of loading capacity could also be effective. The VED system would need to be structured in such a way to be fair to all van users and from an environmental perspective, to discourage use of multiple trips in smaller vans.

Whilst our recommendations for VED do not represent fundamental changes in its operation or role, an amended policy will still act to nudge purchasers into lower emissions vehicles. We believe that current incentive schemes will need to be sustained in the medium term to encourage the uptake of ultra-low emissions vehicles. However, if programmes become financially unfeasible for the government, a shift to equivalent value support through further discounts on in-use charges may offer a solution, as they do in the current company car tax regime.

VED remains a simple, effective and valuable instrument albeit alternative tools will need to operate in concert with VED to ensure the sustainability of overall motoring taxation in the long term. Road user charging with a nationally unified set of guidelines may provide a potent tool in addressing local road transport issues and in controlling for alternative emissions to CO_2.

Positively, if economic activity continues to grow, public finances and revenues will automatically improve. Post-election, if policies are increasingly devolved to local authorities, VED revenues may be maintained for local purposes raising the possibility of hypothecation for local scrappage schemes or funding for localised road traffic schemes.

Over the longer term, local level authorities may consider trialling local economic zones and congestion charge zones to address localised issues such as air quality. A consistent application of the latest Euro regulation standards to both petrol and diesel cars in these zones may also incentivise cleaner technologies. Accordingly, understanding the extent and speed in which new technology can be transformed from design to commercialisation will drive manufacturers' industrial strategies and inform future policies which can complement an adjusted VED regime. Upcoming changes to vehicle testing procedures will also require adjustments to be made to future VED bandings.

In summary, while VED remains an effective tool, continual assessment of the VED regime and modest evolutionary adaptation will be necessary in supporting the UK motoring taxation base in future.

Introduction

In assessing the future of motoring taxation, this report considers both the used and new car and van markets, building upon the current evidence base around motoring related fiscal policies, including regular SMMT research publications such as the New Car CO_2 report. We highlight changing trends in the automotive sector, project future revenues and scenarios for VED and consider reforms to VED and other government policies which would achieve positive sectorial and behavioural outcomes in future years.

We also explore the key challenges facing both stakeholders and manufacturers in the automotive space and assess their implications for the sustainability and robustness of the current VED regime.

The structure of this report is as follows:

- **Section 1** sets the context and examines the evolution of VED in recent years, also introducing a framework which highlights the balancing act between different facets of automotive policy;

- The following **Sections 2-4** discuss the impacts of VED on the key agendas for motoring taxation in the UK: for instance fiscal needs, industrial and technological sector interests, environmental concerns in light of challenging regulatory targets, and fairness and competitive issues given increasing vehicle use and the expected continued growth in road traffic and transport;

- **Section 5** draws conclusions from the above discussion, considering possible further evolution in the VED regimes and reforms and recommendations.

1 UK motoring taxation

1.1 Motoring taxation in the UK

Vehicles and motoring in the UK currently attracts a broad mix of taxes, charges and fiscal incentives. There are two key national aspects of the system of taxation applied to motoring in the UK; vehicle excise duty (VED) and hydrocarbon oil duty (also known as fuel duty). These two taxes affect the majority of motorists' ownership and use of vehicles and raise a significant share of the revenue generated from motoring. However, there are a number of other national taxes on motoring which affect specific groups. Company car tax, under which employees and employers' company cars are taxed through the income tax and NICs systems as a benefit in kind, is one such example. Additionally there are some localised charges on road usage, such as the London congestion charge and the M6 toll, and a series of selected incentives and grants in place to support the uptake of specific types of motor vehicles and development of associated infrastructures.

VED is a national tax levied annually on the ownership of road vehicles. Historically, car VED had a period (in the 1920s and 1930s) as a hypothecated tax to help fund road building and maintenance. It has been levied mostly at a flat rate, but in earlier years it was related to and differentiated on horse power ratings. Proposals to abolish VED and switch the emphasis wholly to fuel duty were made in 1978. However, it survived as it was a stable and predictable source of revenue and had related vehicle register and tracking roles.

After taking office in May 1997, the Labour Government overhauled the flat-rate system to a graduated system, to signal and spur people to choose more fuel efficient models. These reforms initially took the form of two different VED rates based on the size of the vehicle's engine. From 1999, a lower rate of £100 was introduced for small-engine cars (under 1100cc) while large engine cars were charged £155 a year. However, the 2000 Budget further graduated the VED system for all cars registered after 1st March 2001, paving the way for the current system. The rates were based on four bands, split according to their average CO_2 emissions (g/km), and ranged from £100 (<100 g/km) to £155 (>186 g/km).

After introducing additional emission bands in the 2002, 2003 and 2006 Budgets, the system was more significantly adapted in 2008. The 2008 Budget announced that the number of bands would rise from 7 to 13 from April 2009. Further, the level of differentiation in rates across the bands was noticeably increased, with VED for the lowest-emitting cars (Band A - <100 g/km) reduced to £0 and the highest emitting vehicles attracting rates of over £400. As shown in Table 1, the rates in 2015/16 now range from £0 (band A) to £505 (band M) and the banding structure has remained unchanged since May 2009.

With EU targets requiring vehicle manufacturers to reduce the average CO_2 emissions of all their new cars on sale EC-wide to 130 g/km by 2015, VED rates reflected and reinforced that regulations were increasingly being designed to influence consumers' decisions as to which model to purchase. As well as vastly increasing the number of bands, the 2008 Budget announced that from April 2010, a new 'first-year' rate would apply. As can be seen in Table 1, this rate, often referred to as the 'showroom tax', increases the differentiation between the highest and lowest rates at the point of purchase. Currently a

new car rated at 131 CO_2 g/km has a VED value of £130 while a car with a 256 CO_2 g/km rating has a VED value of £1,100. Broadly, for a doubling in the CO_2 rating the VED value increases ten-fold.

Table 1 - VED Bands and Rates for cars in 2015/16 and market structures in 2014, all cars in UK car parc and 2014 new car registrations

		Car Parc Year end 2014		Rate	*New cars in 2014*		Rate
VED Band	CO_2 (g/km)	*All Parc %*	*All Parc cumulative %*	Standard	*All new %*	*All new cumulative %*	1st Year
A	Up to 100	*3.3*	*3.3*	£0	*17.7*	*17.7*	£0
B	101 to 110	*4.7*	*8.0*	£20	*15.9*	*33.6*	£0
C	111 to 120	*8.4*	*16.4*	£30	*20.7*	*54.3*	£0
D	121 to 130	*7.7*	*23.8*	£110	*14.3*	*68.6*	£0
E	131 to 140	*12.9*	*36.7*	£130	*11.4*	*80.6*	£130
F	141 to 150	*12.2*	*48.9*	£145	*6.8*	*86.7*	£145
G	151 to 165	*16.4*	*65.3*	£180	*6.5*	*93.2*	£180
H	166 to 175	*7.2*	*72.5*	£205	*2.2*	*95.4*	£295
I	176 to 185	*5.8*	*78.3*	£225	*1.3*	*96.8*	£350
J	186 to 200	*5.7*	*84.0*	£265	*1.4*	*98.2*	£490
K[1]	201 to 225	*5.0*	*89.1*	£290	*1.0*	*99.2*	£640
L	226 to 255	*3.1*	*92.1*	£490	*0.5*	*99.6*	£870
M	Over 255	*2.9*	*95.0*	£505	*0.4*	*100*	£1,100
unknown		*5.0*	*100*				

[1]: rate also includes cars over 225g/km registered before 23/03/2006. AF Cars discount 2010/11 at £10 for all cars

Source: HMRC, SMMT

Unlike the VED system for cars, the rates for (private and) light commercial vehicles (LCV's) have not undergone such significant changes. The structure of the current VED system for LCV's to 3.5t gvw is basically referenced to engine size. Vans with engine sizes of below 1,549cc pay lower rates of tax compared with those above this threshold. Some registered ahead of the Euro4 and Euro5 emissions regulations deadlines were incentivised with lower VED rates and these still apply.

Table 2 - VED Bands and Rates for vans in 2015/16

Private or light goods vehicles	Not over 1549cc	£145
(Vehicles registered before 1 March 2001)	Over 1549cc	£230
Light goods vehicles *(Vehicles registered on or after 1 March 2001)*		£225

1SMMT data – rate also includes cars over 225g/km registered before 23/03/2006. AF Cars discount 2010/11 at £10 for all cars

Euro 4 Light goods vehicles *(Vehicles registered between 1 March 2003 and 31 December 2006 and are compliant with Euro 4)*	£140
Euro 5 Light goods vehicles *(Vehicles registered between 1 January 2009 and 31 December 2010 and are compliant with Euro 5)*	£140

Source: HMRC

While VED is not currently identified by the Treasury as an environmental tax there is clearly an environmental aspect to the regime for cars and also for vans. The initial changes in structure do not appear to have been motivated by a need to raise revenue. In fact, real (inflation-adjusted) revenues from VED peaked in 1999, falling back fairly substantially following the reforms to the VED system. The changes were made against a backdrop of the EU becoming increasingly focussed on reducing CO_2 emissions from road and other transport modes.

Table 3 – Fuel duties and VED receipts

	2003/4	2007/08	2013/14	2014/15	2019/20 (OBR Forecast)
Fuel Duties	£22.8bn	£24.9bn	£26.9bn	£27.2bn	£28.8bn
cash growth	**100**	109.2	118.0	119.3	126.3
real terms growth	***100***	*97.6*	*92.3*	*91.2*	*89.3*
VED	£4.71bn	£5.24bn	£6.10bn	£6.10bn	£5.50bn
cash growth	**100**	111.3	129.5	129.5	116.8
real terms	***100***	*99.4*	*101.3*	*99.7*	*82.5*

Note 1: cash and real terms growth calculated in indices with 2003/4 base year = 100

Note 2: real terms growth calculated with reference to GDP deflator (market prices).

Note 3: GDP deflator annual average of 2.2% per annum for 16 years 2003 to 2019.

Source: DVLA, HMT, OBR

In 1998, the European Automobile Manufacturers Association (ACEA) and the European Commission reached a voluntary agreement to limit the amount of carbon dioxide (CO_2) emitted by passenger cars sold in Europe. This ultimately formed a precursor to the European Commission's targets for 2015 and later 2020. The European Union followed suit, later introducing regulation that set mandatory CO_2 emissions limits for new passenger cars of 130 g/km for 2015. In light of sustained progress, last year saw a further mandatory target for CO_2 emissions of new passenger cars and light-commercial vehicles implemented.

Motor manufacturers have been successful in achieving significant reductions across their model ranges in CO_2 emissions and this has been a key associated feature to UK new car market trends since the introduction of the graduated VED system. The latest figures for 2014 show that the UK new car market's average for all new cars registered has already reached the 2015 EU target for average new car emissions. However, the UK market must now look forward to the further challenge of achieving the 95 g/km target by 2020. There is a gradual phasing in for 95% of vehicles by 2020 and with 100% compliance required by 2021. (For light-commercial vehicles the current standard is set at 147 g/km of CO_2 for 2020).

Given that all new vehicles with CO_2 emissions of below 130g/km pay no VED in the first year and those under 100 g/km pay no VED at all, it is not clear that the current structure of VED will provide an effective enough nudge to encourage such a progression. Additionally, changes to the efficiency of the overall UK motorparc mean that both cash and real revenues from the current system look unsustainable. Reforms to the current VED system appear necessary.

In addition to VED, the government since 2002 has set company car tax to cars CO_2 ratings. The company car tax regime has also set significant benefit in-kind incentives for employers and employees using zero and ultra-low emission vehicles, albeit incentives will change and taper-out significantly in the next 5 years[2]. On current plans for this regime the 25% tax point (of the appropriate percentage of list price) will be at a CO_2 rating of 105 to 109 g/km by 2019/20 - close to the EU 95g/km new car average specification. Notably this median value for the appropriate percentage rate is far lower than that referenced in previous years (165 to <= 169 g/km in 2013/14 and 215 to 219 g/km in 2002/03). Looking ahead, even the lowest CO_2 emitting new vehicles (with CO_2 emissions of up to 50g/km) will see their tax rise sharply from 5% in 2015/16 to 16% in 2019/20. This may affect demand for company cars, while also raising uncertainty for the industrial interests of UK-based automotive manufacturers.

In addition, a workplace parking levy is sometimes imposed on certain employers and employees. This licensing scheme charges the occupiers of premises or the employer for the provision of workplace parking places. In some cases, these costs may be passed on to employees but often it is left to the local traffic authority to determine who must apply for licences and pay the appropriate sum per parking place.

From 2009, government has also referenced capital allowances (a cost relief for business investment against taxable profits) for cars to their CO_2 ratings and status i.e. a new or used car. The rates and corresponding CO_2 reference ratings for cars were stable from 2009 to 2013, but changed from 2013. These current rates are referenced to CO_2 ratings to 95 g/km, 96 to 130 g/km and 131 g/km and over. A first year allowance is set at 100% for cars with ratings up to 95 g/km; 18% for the main pool of 96 to 130 g/km and 8% for a special pool of 131 g/km and over. At Budget 2014, the coalition government extended the first year allowance for a further 3 years until 31 March 2018. From April 2018, the CO_2 thresholds will be cut from 95 g/km to 75 g/km. This will be necessary to reduce the expected increase in expenditure associated with current allowances and to encourage incentives to buy even greener cars in

2 Society of Motor Manufacturers and Traders, *New Car CO_2 report 2015.*

future. Table 4 illustrates the car capital allowances regime and its distribution in terms of the UK car parc and new car registrations in 2014.

Table 4 – UK capital allowances CO_2 bands/rates and percentage shares of all new cars and car parc

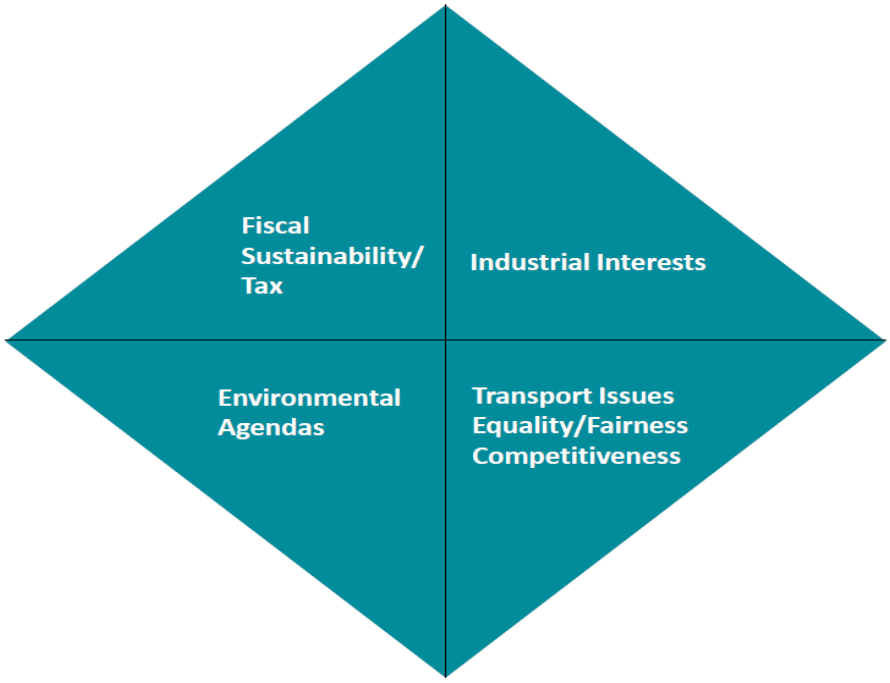
	To 95 g/km	18% - 96 to 130 g/km	131 g/km and over
Allowance type	**100% first year allowance**	**Standard allowance**	**Special allowance**
All car parc at 2014	1.1%	18.5%	80.4%
All new cars in 2014	6.4%	62.2%	31.4%

Source: SMMT

1.2 Analytical framework – the key strategic agendas

Our quadrant framework below highlights a number of key strategic interests, which are important when considering reforms to the current VED system. However, the difficulty lies in balancing the needs of all stakeholders in the UK's new car markets, the car parc and use of vehicles on the road transport networks.

Figure 1 - Quadrant framework of key strategic interests



For instance, the government's key objectives may be to ensure the sustainability of future VED revenues by amending fiscal policy where necessary, while also seeking to address environmental agendas. However, it also has growth, fairness and sector-partnership agendas to balance in the policy mix. Meanwhile given the rapid pace, scale and costs of technological development, automotive manufacturers require continuity and stability in VED regimes, ideally with governments providing forward guidance to vehicle markets on automotive policy 3-5 years ahead. This helps manufacturers, distributers, vehicle users and other stakeholders to plan longer term automotive strategies. It also helps to tailor marketing and production, using decisions to best meet their operating and commercial interests and their regulatory and environmental responsibilities. From a transport user's perspective – consumers and businesses – stability and/or continuity in trends in motoring costs and access to improved and more efficient vehicles are key issues. And fundamentally, it is important that taxes are designed to be fair for all taxpayers and that any reforms to VED – be it via rate changes or band/scale differentiation for VED designs remain competitive and fair for all users. Below, we briefly outline the key segments of the quadrant, providing the context for our discussion of VED in Section 2.

1.3 Industrial Interests

The UK automotive industry forms a key section of the UK's manufacturing sector. In 2014, the industry as a whole employed around 770,000 workers and produced 1.5 million cars, vans, buses and trucks and a further 2.5 million engines. As a result the UK was the fourth-largest automotive producer in Europe and 14th globally. Given recent growth and investment in domestic motor vehicle manufacturing, the sector is likely to play a key role as part of the government's objective to rebalance the UK economy, increasing exports and supporting greener growth in the manufacturing sector. The Automotive Council, a body established in 2009 to enhance dialogue, co-operation and partnership between the automotive sector and the UK government has shaped a strategy for the UK automotive sector and highlighted its key priorities in supporting emerging technologies, developing skills and employment and encouraging sustainable growth based on a positive and attractive business location for automotive companies.

The UK automotive sector is diverse with more than 40 companies manufacturing vehicles, including 11 of the world's global vehicle and engine manufacturers. With the significant presence of premium and luxury producers, such as BMW, Jaguar Land Rover, Bentley and Aston Martin as well as niche vehicle producers, the UK is the world's second largest producer of a wide portfolio of premium and luxury vehicles. The UK is also a significant global player in advanced propulsion systems. For example, the UK produces a third of all engines for Ford worldwide and has significant expertise focussed on the design and manufacture of engines. As such, the UK is well placed, based on its strength in technology, to further develop the manufacturing of design and production of powertrains, particularly alternative propulsion systems, and to benefit from the development and production of ultra-low carbon vehicles.

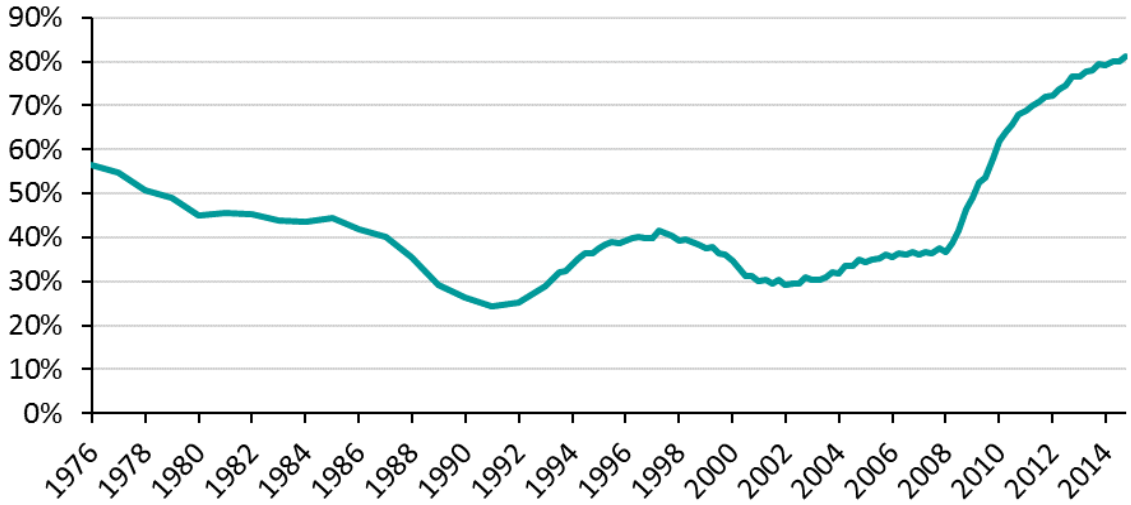
It is important that these elements of the UK automotive sector are recognised in the overall structure of motoring taxation and particularly in the design of national taxes such as VED. While access to the European community is a key driver of the location of car manufacturing in the UK, the strength of the UK's domestic market is an important component in the UK's competitive advantage. As such, it is important that the VED tax regime aids strategic industrial interests in the domestic market and enables the effective development of the emerging ultra-low emissions vehicle (ULEV) markets.

1.4 Fiscal and tax sustainability

Raising revenue to fund the various forms of public expenditure is one of the key objectives for the majority of taxes imposed around the world. With government expenditure accounting for over 40% of GDP, the UK is no exception. In fact, given the focus on eliminating the government's budget deficit, raising revenues has become an increasingly important agenda in recent years. Since the early 2000s, the UK's debt to GDP ratio has crept up. The financial crisis and subsequent recession put considerable additional pressure on the UK's public finances, with difficulties in the banking sector resulting in the government bailing out a number of financial institutions. Furthermore, debt typically rises during periods of economic contraction as reduced economic activity translates into lower receipts from areas such as income tax, corporation tax, stamp duty and so forth. At the same time, higher levels of unemployment result in benefit spending increasing.

While the government budget deficit has fallen since its peak in 2009/10, the government continues with a substantial borrowing requirement. As of the end of February 2015, public sector net debt stood at almost £1.5 trillion, 79.6% of UK GDP. The value of this debt will continue to rise until the government eliminates its budget deficit, which the Office for Budget Responsibility (OBR) estimates was £90.2 billion in 2014/15. Based on the policies of the Conservative – Liberal Democrat coalition, the OBR forecasts that the government will achieve a budget surplus in 2017/18. However, to reach this target, or to eliminate the deficit in general, further tough measures are required over the course of the next parliament, be it cuts to government spending or finding ways to increase government receipts. The probable implication for VED and other related taxes on motoring is that they are likely to be needed as stable and durable revenue streams for the foreseeable future and also longer term.

Figure 2 – UK Public Sector Debt, % of GDP



Source: Office for National Statistics

1.5 Environmental agendas – vehicle use, traffic congestion, emissions & public health

Taxation is also justified on the basis of market failure. This occurs when the actions of individuals produce costs which fall on others, called *external costs*. Pollution is a classic example of market failure because the cost of economic activity creating pollution – in this case, driving – is only partly borne by the driver through the cost of fuel. There are external costs borne by others: firstly through climate change and its effects and secondly through air pollution and its effects. These two environmental problems involve different emissions – carbon dioxide (CO_2) in the first case, and nitrous oxide and particulates in the second. The social costs imposed on others justify the taxes associated with correcting the market failure through changing behaviour. The aim is to create a situation whereby the social costs are applied primarily on the polluter instead of being imposed on all users.

The magnitude of taxes is also important. While some activities have undesirable effects, they may have offsetting benefits. An appropriate response is a tax which makes doing the activity only beneficial when the social benefits outweigh the associated social costs.

Environmental taxation on motoring should encourage and empower drivers towards cleaner alternatives, better journey management and driving styles, rather than seeking to eliminate the activity. As well as the benefits of transport itself, the manufacturing sector provides numerous high-skilled jobs for the UK economy. A number of ways to mitigate the environmental effects of driving are available: using electric vehicles, hydrogen-powered cars, biofuels, more efficient conventional cars, increasing the proportion of diesel cars, and new technologies will produce additional options in the future. A raft of fiscal policies at both European and national level has helped to reduce CO_2 emissions already; we evaluate past success, use evidence from other countries and explore options for future policies.

1.6 Fairness

Another feature of a good tax regime is fairness and enabling equality of access and opportunity for all. This means applying the same principles across different groups: if movement to lower-emissions vehicles is encouraged in cars, it should also be applied to light commercial vehicles (LCVs/vans). Neither should certain groups have to shoulder disproportionate shares of the overall fiscal burden. Diesel vehicles have been encouraged through the VED regime due to their lower CO_2 emissions; now they are to be treated more restrictively than petrol vehicles in a new London ultra-low emission zone. Policy must seek to resolve such contradictions within a technology and specification neutral context.

This report highlights fairness issues particularly in the context of a regime which, due to its association with the UK new car market achieving substantive environmental gains, has increased the proportion of drivers who now do not pay VED. While policy change is necessary, the success of the regime in other respects suggests that its principles should remain broadly similar over the medium term.

1.7 Addressing challenges and reforms to VED

Cebr sees the strategic agenda of interests highlighted in the earlier quadrant framework must be simultaneously addressed when considering the challenges and reforms to the current VED system. Our

research and discussions with stakeholders leads us to believe and so recommend that the VED regime needs to develop in the evolutionary way it had since its inception in 1999. Also, options for significant reform should be canvassed and consulted with stakeholders so that the objectives, market effects and expected outcomes are clear and seen to be practical – however challenging they are set. Manufacturers and motorists will not welcome higher VED taxes, but there can be a more informed and clearer understanding of the market, regulatory and political practicalities if government is clear on the primary roles and outcomes it expects from VED and other motoring taxes.

The current VED system seems to have worked well, it has been associated with an effective change in the overall CO_2 efficiency of the annual new car flow and the car parc. Also, it has been a durable, albeit weakening means of raising revenue for the government. The VED's regime structure has also proven to be effective in nudging private consumers and company car users into lower emission bands across the new car market's CO_2 continuum. Importantly, consumers understand the VED system and targeting of CO_2 emissions, enabling informed choices as to the effects they impose on the environment. This recognition is important in triggering responsive behavioural outcomes and has been substantially reinforced by the new and used car labelling initiatives which were introduced to the UK car markets from the mid and late 2000s respectively.

As a whole, the UK new car market has risen to the challenge of meeting European new car CO_2 targets for vehicle manufacturers ahead of time. This may have further encouraged investment in the manufacturing and automotive sectors in the UK. In 2014, average new car CO_2 emissions reached an all-time low of 124.6g/km, declining by over 30% since 2000. Whilst the UK new car market is already characterised as meeting the 2015 EU target of 130g/km, an annual average reduction of 4.2% will be required to achieve the EU 2020 CO_2 target of 95g/km. The UK performs favourably in comparison to Germany, Sweden and Austria who recorded 2013 emissions of 135 g/km, 135 g/km and 132 g/km respectively, albeit there remains room for improvement with European peers such as Netherlands, Denmark and Portugal which report lower average CO_2 emissions of 109g/km, 113 g/km and 114 g/km.

In order to retain the purpose and value of VED, we see modest policy reforms as acceptable and necessary. Currently around 2 out of 3 new cars are exempt from VED, providing an in-built advantage to purchasing new vehicles. Also, it is possible that substantial changes to the VED system could cause confusion and raise some uncertainties for suppliers, distributors and motorists, stymieing take up of greener cars and so the pace of improvements in the environmental agenda.

A VED system which focuses solely on CO_2 emissions is also appreciated. Expanding the VED policy to incorporate additional emissions such as Nitrogen Oxides (NOx) and Particulate Matters (PMs) may complicate an already simple and comprehensible system. Alternative policies such as the Ultra-Low Emissions Zone (ULEZ) scheme can be used to tackle issues such as air quality and if necessary, applied at a nationwide level in future to ensure fairness, consistency and to reduce fragmentation of policies across regions.

Looking ahead, it is fundamental to retain the key principles of simplicity, fairness, continuity, certainty, proportionality and durability of VED policy in future years. From a manufacturer's perspective, future changes to the VED regime should aim to be set out clearly and in a timely manner. Stability and clarity

(of focus on efficiency via CO_2) of the present regime are valued features. Additionally, increased transparency, greater certainty in the VED regime and signposting over a number of years could enable manufacturers to plan effectively and implement longer term product development and business strategies, rather than continually playing catch-up. In turn, this would underpin investment and production, both domestically and internationally and support sustainable growth in the automotive industry.

2 Automotive agendas

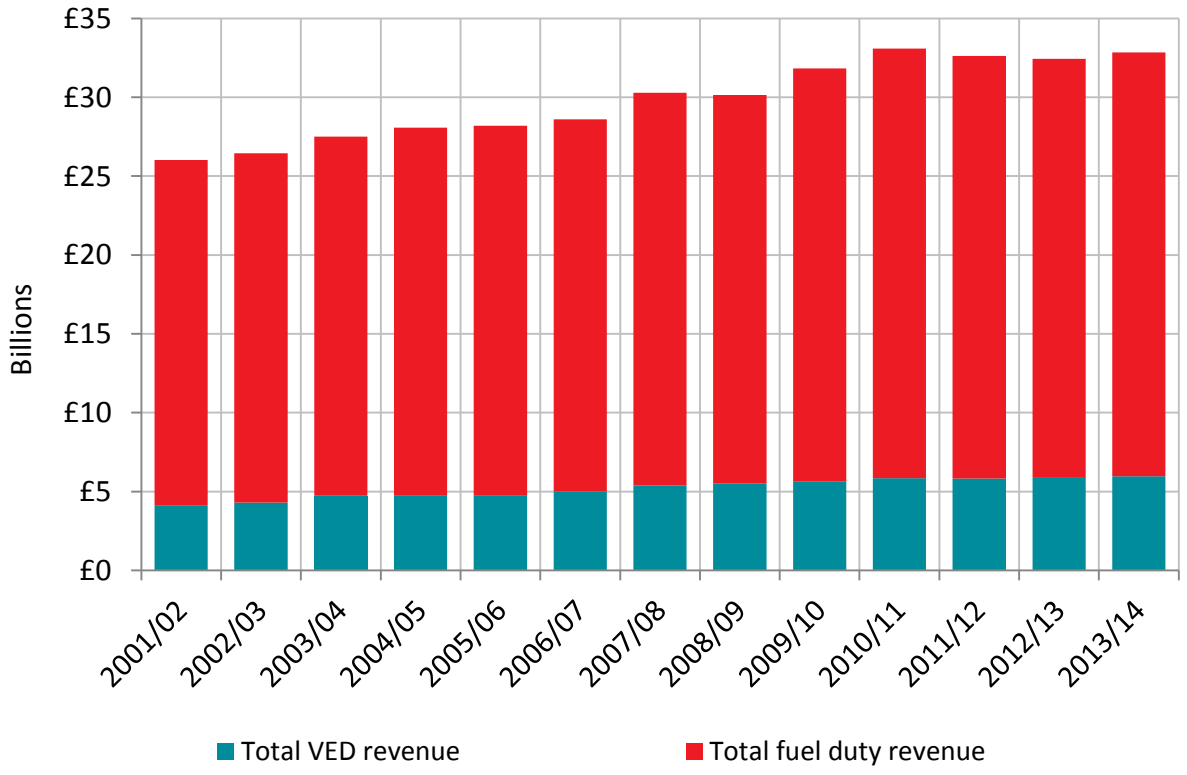
2.1 Fiscal and tax sustainability

The overall tax take from motoring forms an important share of government revenues. The combined revenue from the two major motoring taxes, VED and fuel duty, has stood at over £30 billion since 2007. In 2013/14, of the total tax take of nearly £33 billion, VED from all vehicles contributed just under £6 billion of revenue compared with £27 billion from fuel duty (excluding the VAT charged on top of fuel duty). As a result, revenues from VED were equivalent to 1.2% of all tax receipts in 2013/14.

While VED revenues have risen in monetary terms in recent years, they have declined slightly in real terms. As shown in Figure 4, despite the size of the motorparc increasing over the period, real revenues from VED peaked in 1999, falling back fairly substantially following the initial reforms to the VED system. Revenues in real terms (2013 prices) have since held relatively steady around the £6 billion level but this rather masks the fiscal issues faced.

In 1999, the effective tax base for VED revenues from passenger cars was 27.4 million vehicles. By 2014 this was 32.6 million, a rise of 5.2 million vehicles over 16 years and a total growth in volume of 19%. This has contributed to the nominal increase in VED revenue from cars, which has risen by around 25% in cash terms over this period. However, the average tax rate in real terms has noticeably declined over the period and as such real revenues from cars is currently below the level recorded in 1999.

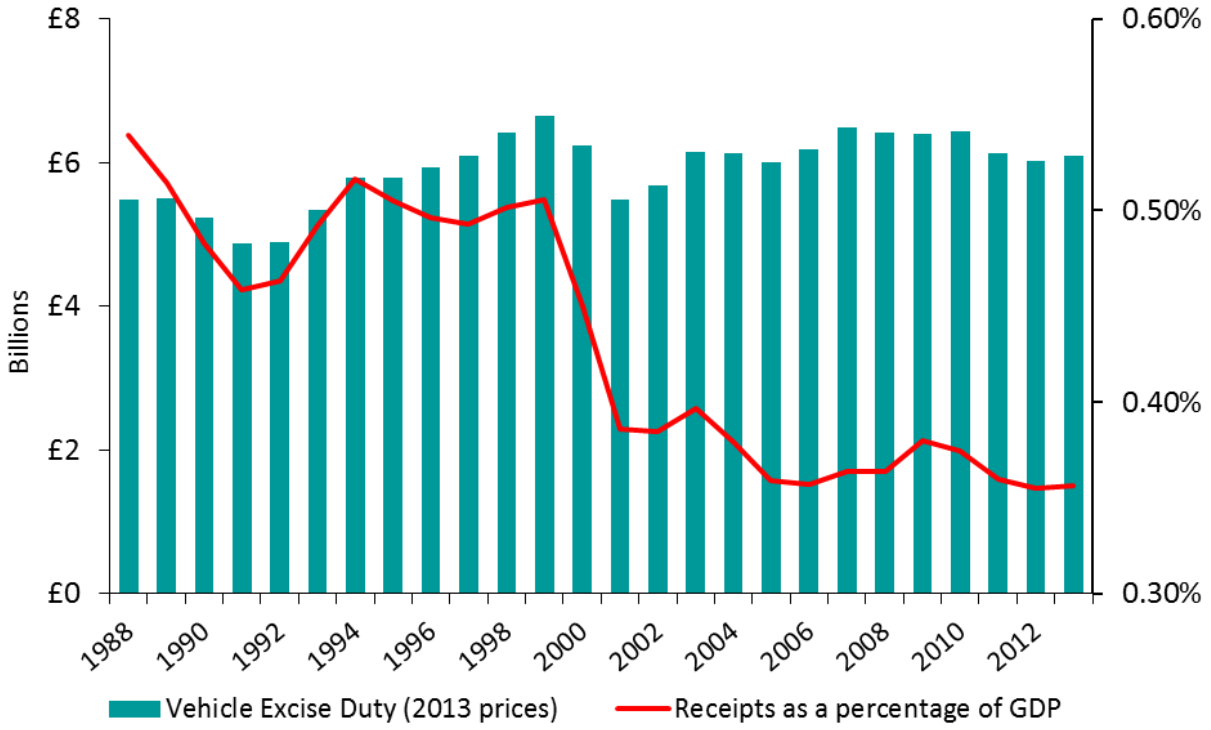
Figure 3 - Revenue from VED and Fuel Duty (£ billions)



Source: Office for Budget Responsibility

Declining VED revenues are more apparent when viewed as a share of GDP, which have fallen from 0.51% in 1999 to 0.36% in 2013. While the (standard) rates associated with some of the VED bands have increased considerably, the tax on the top band (M, over 255 g/km) has increased from £165 in 2005/06 to £505 in 2015/16 and the lowest bands have seen rates fall. At the same time, the average fuel efficiency of the wider motorparc has steadily improved.

Figure 4 - VED receipts, real (2013 prices) and as a share of GDP

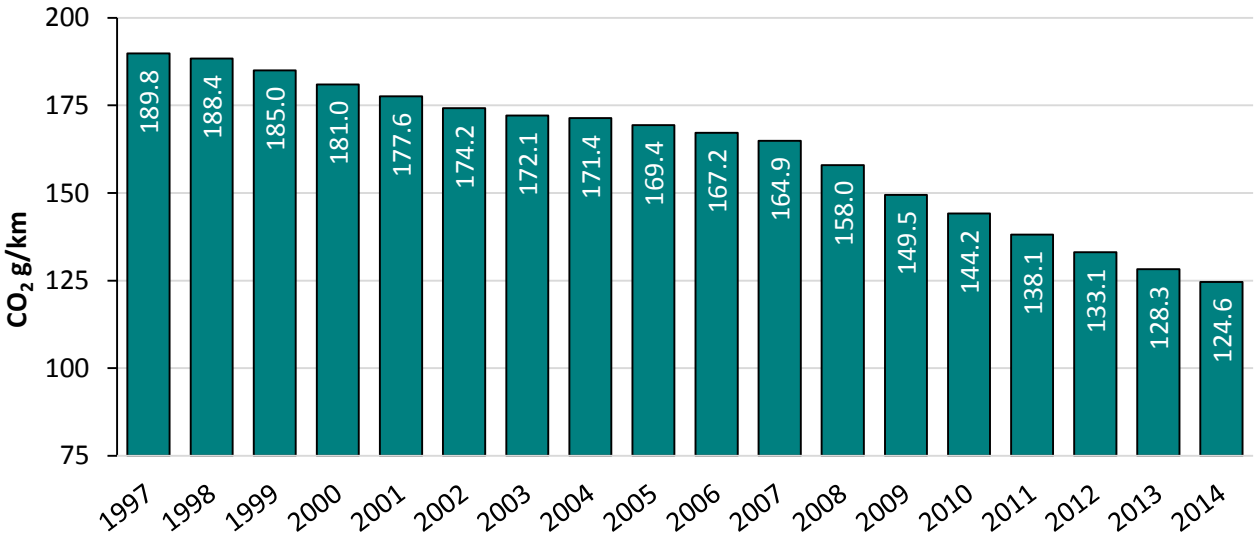


Source: HMRC, Office for National Statistics, Cebr analysis

The structure of the graduated VED system means that the most efficient vehicles, those with CO_2 emissions <100 g/km, currently pay no VED, be it a new car or a vehicle already registered and paying the standard rates. Motor manufacturers have successfully reduced the average emissions of their products over recent years and, as shown in Figure 6, there are significantly fewer new cars available in the market that attract the very highest VED rates.

At the same time the number of cars with CO_2 emissions below 130g/km, thus attracting no first-year VED has increased considerably since 2000 as shown in table 1. In fact, the increased efficiency means that the average new car sold in the UK in 2014 attracted no VED in its first year, with emissions of only 124.6 g/km, a considerable fall when compared with 181 g/km in 2000. 68% of new cars registered in 2014 were at or below band D (121-130 g/km). Thus, the estimated £170 million in revenue collected from the first registration fee in 2014 was borne by just 32% of new car buyers, albeit this share has declined rapidly in recent years - in 2007 just under 90% of new cars were band E (131-140 g/km) or above.

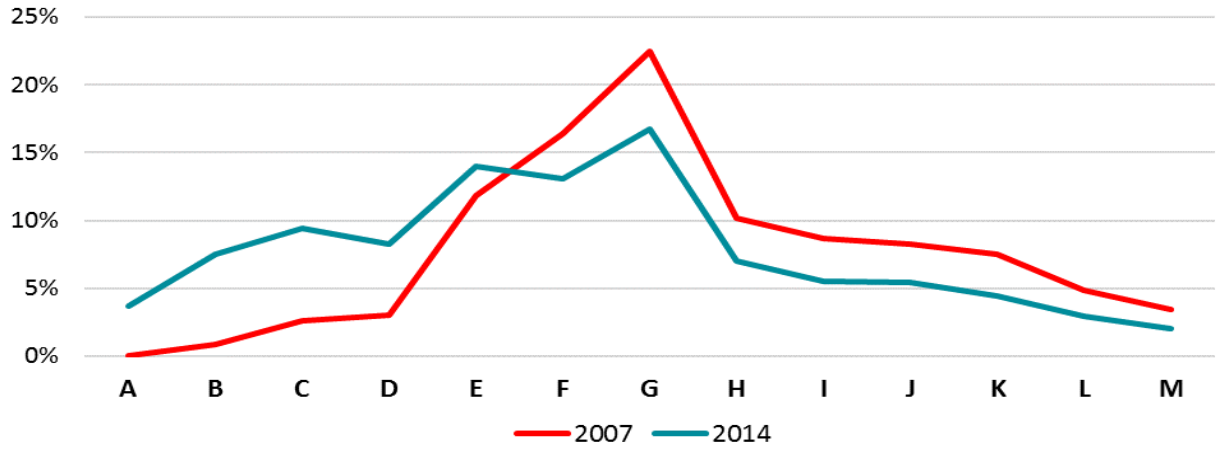
Figure 5 – Average New Car CO_2 Emissions, 1997-2014



Source: SMMT

These increasingly efficient new cars not only place pressure on the revenue raised from the first year VED rates. Over time, this shift has had an impact on the total VED take as older, more polluting cars are replaced and the overall motorparc becomes more efficient. As highlighted in the first section, while first year VED rates are more heavily graduated, the difference between the lowest standard rates and those associated with the highest bands is still considerable – the difference in the value of VED to be paid between the average new car (band D, 121-130) and the top rate at 256 CO_2 g/km and more is £395. However, as shown in Figure 6, the share of the overall motorparc that falls within the higher revenue bands has fallen considerably in just seven years between 2007 and 2014. As such the average VED rate has fallen, meaning that despite the overall motorparc expanding, VED receipts have remained fairly static.

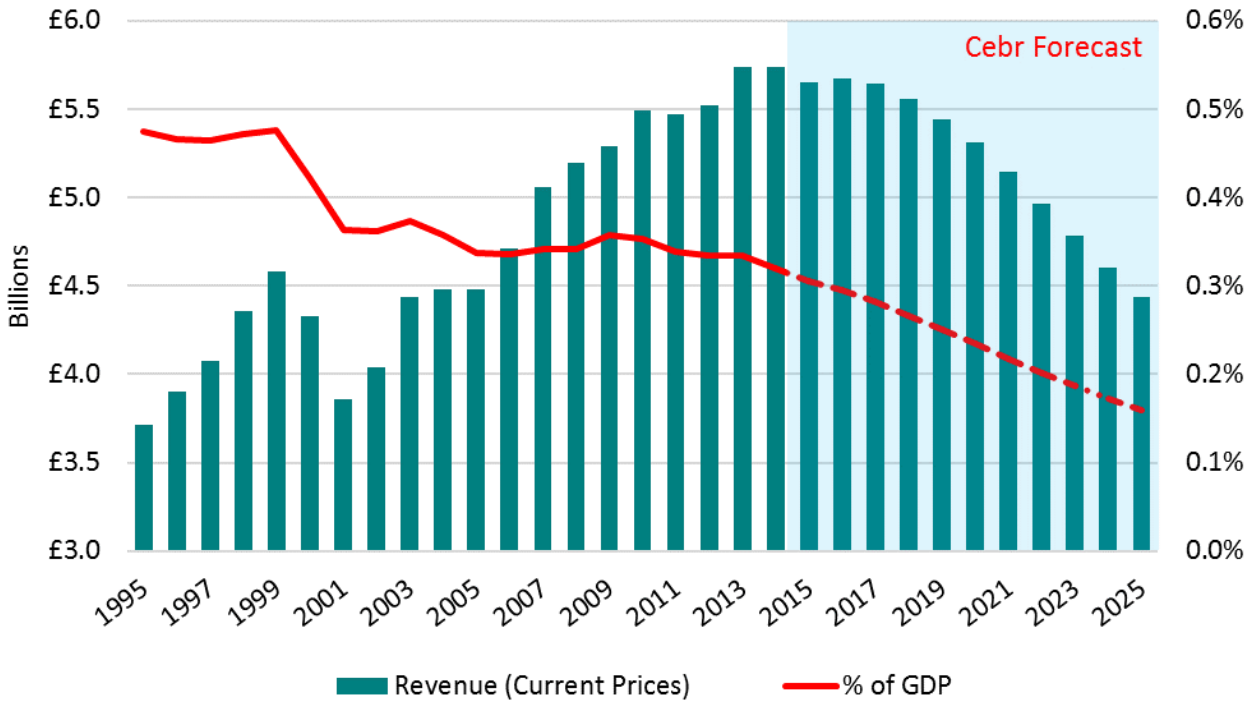
Figure 6 – Share of cars in UK motorparc (registered post-2001) in each VED band



Source: SMMT

While VED receipts remain broadly stable, our medium-term forecasts suggest that VED receipts from cars will begin to fall in both nominal terms and as a percentage of GDP from 2015/16 onwards. Our central forecast, which is based on recent rates of reduction in average CO_2 emissions and the UK marginally meeting the 2020 EU target of 95 g/km, would see revenue fall from over £5.7 billion in 2013 to around £4.4 billion in 2025, even with VED rates revalorised by RPI inflation each year. This implies that receipts would fall from their 2013 level of 0.33% of GDP to just 0.16% in 2025. Our central forecasts suggest that by 2025, based on the current system, nearly three quarters of all new cars would be exempt from VED payments altogether, placing continued pressure on VED revenues in the years beyond our forecast horizon.

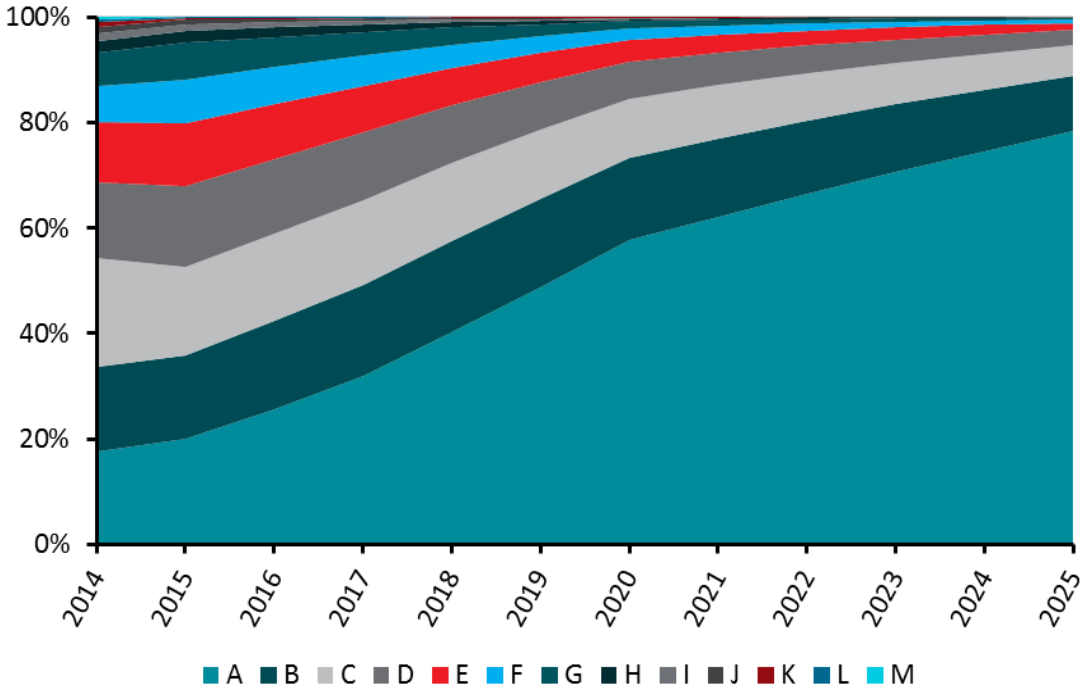
Figure 7 – Vehicle Excise Duty Projection (Cars)



Source: SMMT, HMRC, DfT, ONS, Cebr analysis

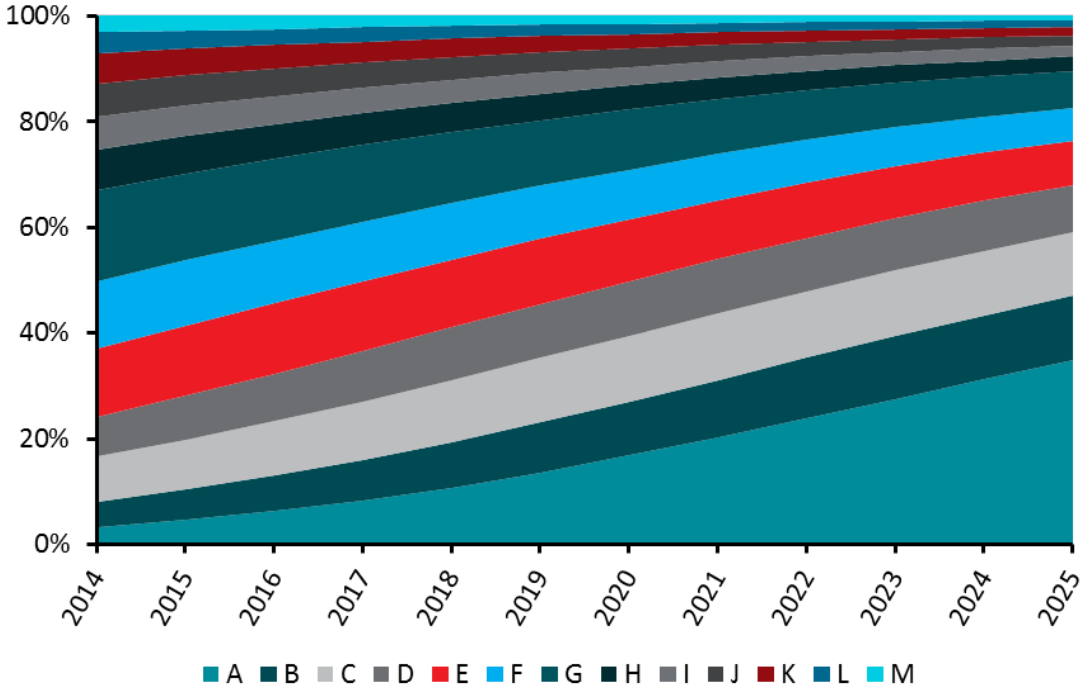
Clearly, under the current system, VED as a revenue generating tax is fiscally unsustainable. While VED rates can be raised, the probable improvements in efficiency are likely to mean that the tax base narrows to the extent that considerable increases in the rates on bands B – M (101+ g/km) would be needed to maintain revenues as a share of GDP. At present, less than two-thirds of the projected motorparc in 2025 falls within bands B – M compared with 97% in 2014. However, such a solution would be fiscally unsustainable in itself. The uptake of vehicles in the lowest VED band would be likely to accelerate in response to such a solution as individuals respond to higher tax burdens by replacing their vehicles for alternatives that attract zero VED. Additionally, this solution could have a significant impact on UK automobile manufacturing as it damages the domestic market for premium vehicles, which typically produce higher levels of CO_2 emissions than competitors.

Figure 8 – Distribution of new car registrations across VED bands



Source: SMMT, Cebr analysis

Figure 9 – Distribution of VED bands for projected motorparc



Source: SMMT, Cebr analysis

On a pure revenue basis, the most sustainable structure for VED would be one in which changes to vehicle efficiency do not impact upon tax rates. Similar to the car market, average CO_2 emissions for LCV's have declined in recent years. However, given VED rates for vans are not explicitly differentiated by CO_2 emissions, there is less pressure on the revenues being raised from this section of the market. However, the move to graduated VED bands for cars was not motivated by revenue needs and reverting to a flat-rate for VED could reverse any influence the system has in supporting the UK in meeting the EU targets for emissions in 2020 and beyond. Given the considerations covered in later agendas, incremental reforms to the current system are likely to be the most constructive reforms in the medium-term.

As average new car emissions approach the lowest band (<100 g/km) it is clear to some extent that any incremental reforms to the system would require a change to the current banding system, with more bands introduced within the present band A (to 100 g/km). For the proportionate size of the tax base to be maintained over the forecast period, the zero VED rate would need to be limited in 2025 to those vehicles with 65 g/km of CO_2 emissions or less (if extended to all vehicles registered after 1 April 2001). Based on our projected motorparc in 2025 and the revalorised version of the current VED structure, the government would need to collect an additional £99 *(2014 prices)* on average from vehicles currently classified as band B – band M in order maintain real VED revenues from cars (excl. first-year rate) at their 2014 levels. By extending the tax base to include vehicles with CO_2 emissions between 50 – 100 g/km, the average additional tax burden would fall to £67.

Table 5 – VED rates required to maintain revenues in real terms

VED Band	CO_2 emission figure (g/km)	2015 Standard Rate	2025 Standard Rate (Current System)	2025 Standard Rate (Band A split)
A	**Up to 50**	£0	£0	£0
	51 to 100	£0	£0	£92
B	**101 to 110**	£20	£163	£120
C	**111 to 120**	£30	£176	£133
D	**121 to 130**	£110	£285	£242
E	**131 to 140**	£130	£313	£269
F	**141 to 150**	£145	£333	£290
G	**151 to 165**	£180	£381	£338
H	**166 to 175**	£205	£415	£372
I	**176 to 185**	£225	£442	£399
J	**186 to 200**	£265	£496	£453
K	**201 to 225**	£290	£530	£487
L	**226 to 255**	£490	£803	£760
M	**Over 255**	£505	£823	£780

Source: SMMT, HMRC, Cebr analysis

A change to the current structure appears sensible especially given the current company car tax regime which was reformed more recently already bands vehicles below 100 g/km. However, the key issue to address would be the extent to which the rates changed across the emissions spectrum. Currently the first noticeable differentiation in the standard rate occurs between band C and band D. The new car average falls within band D so increased differentiation below band C is likely to be required. However, at £20, there is little scope in the current rate structure to create meaningful differentiation.

2.2 Industrial strategy and technological agenda

Budget 2015 emphasised the importance of the UK automotive industry in maintaining competitiveness, encouraging sustainable growth and expanding job creation. The UK government remains supportive of greener growth and regimes such as VED provide an effective pathway for transforming markets to meet the Committee on Climate Change ambitions to decarbonise road transport. The UK Automotive Council's strategy keenly supports emerging technologies and the development of supply chains and associated infrastructures. Investment in new technologies, innovation and research and development is fundamental to encouraging investment in alternative forms of low emission vehicles.

Promisingly, as highlighted in KPMG's report: "Connected and Autonomous Vehicles: The UK Economic Opportunity", the UK has expanded growth in connected technologies, enabling autonomous (driverless) vehicles to help shape the future of transport and to sustain the growth of the automotive sector. Increased vehicle intelligence in the form of optimisation of routes (for instance GM's on-board car systems uses navigation to avoid traffic hotspots), less car parking searches and more efficient travel times also reduces idling traffic and congestion, increasing efficiency and reducing emissions. In turn, lower emissions have consequences for the evolution of VED and future fiscal policies. The ability to monitor road usage and distances travelled may also inform future transport policies, potentially resulting in greater acceptance of complementary VED policies such as road pricing schemes.

Progressive development in automotive design has also allowed improvements in engine power and powertrains to reduce CO_2 emissions. Regenerative braking technologies allow for improved efficiency via reducing fuel consumption and CO_2 emissions to help support the environment. The UKH2Mobility Consortium partnership supports hydrogen as a sustainable and viable transport fuel, encouraging diversification in energy supply. However, there remains pressure in securing longer-term investment to fund high set up costs and in promoting public awareness and acceptance of new technologies.

Commercialising new technologies also requires time and often significant co-investment from industry partners. Given the UK's robust automotive domestic base, its strong export potential and the opportunities to collaborate with key global manufacturers on green technologies, there are clear incentives to shifting R&D bases and production to the UK. However, setting the right conditions for investment at the outset can attract innovative auto companies, helping to establish the UK as a leading location for investment.

It is important for these elements of the UK automotive sector to be recognised in the overall structure of motoring taxation and in any redesigns of VED. The VED tax regime currently aids strategic industrial interests in the domestic market and enables the effective development of the emerging ultra-low

emissions vehicle (ULEV) markets. Looking ahead, the aim is to nudge manufacturers and consumers along the supply chain and increasingly into electric and alternatively fuelled cars, supporting carbon reduction targets and improving the energy efficiency of the overall fleet.

From a firm perspective, unless there is assurance of sufficient demand for new alternatively fuelled vehicles, subsidies and government incentives are often required. Feebates across Europe have played an important role in influencing consumer choices of efficient cars and in encouraging manufacturers to respond by upgrading technology and spurring growth in the medium term. However, compared to France, feebates may not be as effective in countries with larger automotive industries such as the UK, which also include many niche and larger scale premium car producers. Looking to the future, innovation and investment in new technologies is re-focussing towards electric and alternatively-fuelled vehicles. Providing forward guidance on policy should encourage alignment with government strategy to shift to lower carbon vehicle production, in turn reducing the need for rebates as incentives in future.

Similarly, countries with larger automotive industries remain mindful of the needs of their domestic base. Germany for instance, chooses to operate VED using relative (rather than absolute) CO_2 ratings, which enables comparisons of vehicles in the same type or class, thereby automatically preventing larger cars (for which Germany is a key producer) to fall into lower, less efficient VED bands. However, implementing such a system in the UK would reverse some of the behavioural improvements that have already been made in encouraging newer, greener cars which support a younger overall motorparc. Higher company car taxes in future and tighter restrictions on capital allowances for businesses will also go some way in encouraging behavioural change to greener cars.

Additionally, advance notice and continuity of government policies are viewed as important aspects of regimes such as VED. A transition is expected from the current New European Driving Cycle (NEDC) to a Worldwide harmonised Light vehicles Test Procedure (WLTP) in 2017, potentially resulting in higher CO_2 emissions. This is considered in more detail in the box below.

European testing procedures – the transition in 2017 from a New European Drive Cycle (NEDC) to a Worldwide Harmonised Light Vehicles Test Procedure (WLTP)

Current VED band charges can influence the choice of greener cars and the resulting level of CO_2 emissions. At present, the European type-approval procedure for fuel consumption and CO_2 emissions of cars – the New European Drive Cycle (NEDC) includes a number of tolerances and flexibilities which no longer accurately reflect state of the art technologies.

The EU is therefore planning to replace it with the newly developed Worldwide Harmonised Light Vehicles Test Procedure (WLTP) in 2017. This is welcomed by the industry as the current discrepancies between test and real world figures do little to reassure consumers or present manufacturers in a positive light. In turn, this will have consequences for the current NEDC-based CO_2 passenger cars' emission target for 2020/2021 (95 g/km), which will need to be adapted to the new testing procedure.

The International Council on Clean Transportation (ICCT's) 2014 report quantified the impact on emissions, noting that the "effects of the new driving cycle and the new definition of the vehicles' test masses result in a new WLTP-based target of 100 g/km for 2020" - compared to the current NEDC 95 g/km target. If the ambient test temperature is also changed for the EU-WLTP, to 14°C instead of 23°C, an additional correction of 2 g/km would be appropriate, making the target 102 g/km.

Many including the SMMT welcome these developments, albeit the introduction of the WLTP in the UK raises questions as to the wider implications on how differing CO_2 targets will be resolved and the discontinuities it may pose on current taxation schemes such as VED and company car taxes. Additionally, consumer labels are based on the NEDC so there will be a break point at some point in the future where older products will be based on the NEDC and new products on the WLTP. The WLTP is widely expected to produce higher CO_2 emissions than that recorded under the NEDC procedure, meaning that significant changes or re-banding of VED may be required to ensure revenues are sustainable but also fair for all.

The European Commission and UK government are investigating how they will be taken into account going forward and over what timeframe the transition period will be managed. It is likely that tax revenues will increase as a result of more stringency in testing, although more frequent reforms may be difficult to incorporate in future, given the need for clarity, transparency and forward guidance for automotive manufacturers and buyers. This could mean that the timing of reforms or any adjustments to VED, bands or targets may be announced earlier in the new parliament to enable manufacturers to have a timely transition to the WLTP in 2017.

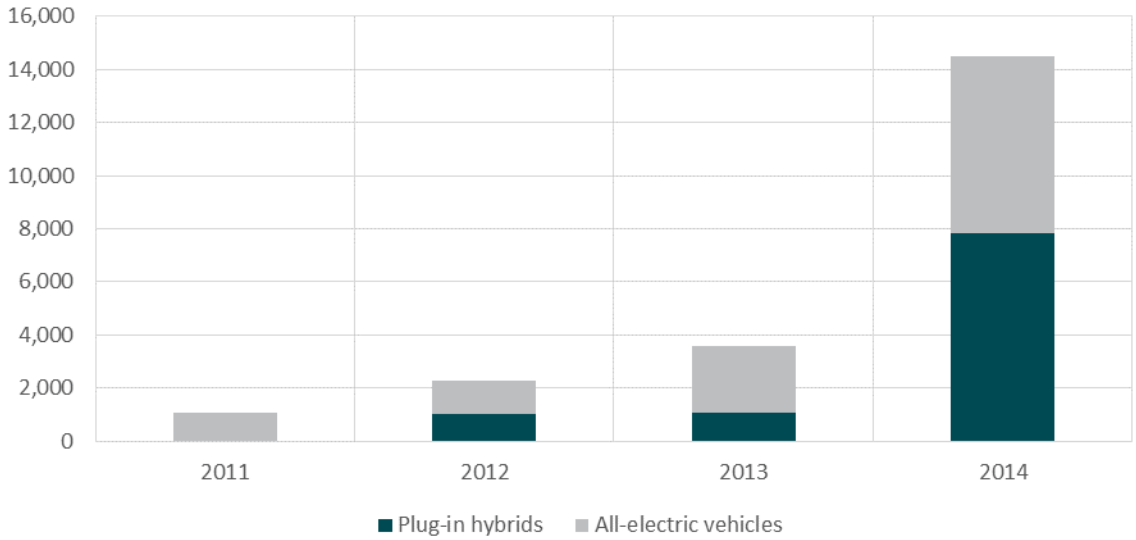
2.3 Transition to ultra-low emissions vehicles

Support for low-carbon vehicles reconciles two important policy aims. It helps the UK to reach future EU CO_2 emissions targets, such as average new car emissions of 95 g/km by 2020, while also supporting high-value manufacturing and engineering domestically. Progress on emissions reduction in conventional vehicles will slow: substantive new emissions reduction will have to come from new technologies such as hybrid vehicles, plug-in vehicles, battery electric vehicles and hydrogen technology.

The government has already set up the Office for Low Emissions Vehicles (OLEV) to lead initiatives to stimulate uptake of alternatively fuelled vehicles, electric cars in particular. In seeking to increase uptake of ULEVs, the government has also committed to installing rapid-charging points approximately every 20 miles on 95% of the Strategic Road Network. This featured as part of the key Roads Investment Strategy (RIS) announcement in the 2014 Autumn Spending Review.

While the uptake of plug-in hybrids and electric vehicles has grown very rapidly recently (Figure 10), as a proportion of all new vehicles sold they remain just 0.6%. In order for the government to meet its legally binding CO_2 emissions targets, the Committee on Climate Change estimates that 60% of the UK's entire motorparc will need to be electric by 2030.[3]

Figure 10 - Numbers of plug-in hybrids and all-electric hybrids



Source: SMMT Electric Vehicle registrations

There must be some assurance for manufacturers that new electric vehicles will be both demanded and purchased by consumers. Any new incentive regime will need to overcome the high upfront costs that would otherwise fall on consumers and discourage early uptake. So far the regime's main feature has been the plug-in car grant, which offers an incentive of a discount worth 25% of the car price up to £5,000. For vans, a discount worth up to £8,000 is available. This was introduced in 2011, before which the number of electric vehicles was negligible, and in conjunction with other initiatives it has since contributed to the large increase in plug-in hybrids and electric vehicles on the road, which was four-fold in 2014 alone.

Over a medium to long timeframe, the plug-in grant should become unnecessary as the new technology becomes more economically competitive with conventional vehicles. As the number of electric cars grows, the grant will also become fiscally unsustainable, and so the government has imposed a cap on the total funding being made available. A planned extension to the scheme of £200 million should give

3 Committee on Climate Change, *Meeting Carbon Budgets – 2014 Progress Report to Parliament*

the vehicle and supplier manufacturing industry and the emerging ultra-low emission vehicles and electric vehicle markets some confidence that public support will continue over the near term. However, given the emerging and still uncertain durability of market developments it may require an extended period of aid to buy or lease such vehicles. Eventually the scale of aid will significantly taper or switch to vehicle in-use discounts, such as congestion charge or road use fees exemptions, preferential parking, tax offsetting for fleet users, and similar policies.

Another policy designed to incentivise uptake of ULEVs is a significant reduction in company car tax for the very lowest CO_2 emitters. The potential here is greater given that business users often show stronger responses to incentives than private users (see Figure 14).[4] In 2015/16, there will be a steep step up in tax from 5% to 9% when the new car's efficiency crosses the 50 g/km mark, and another from 9% to 13% at the 75 g/km mark.

The larger tax differentials between CO_2 bands will diminish gradually and the tax on lower and ultra-low emissions vehicles is set to increase significantly by 2019–20.[5] However, the link to efficiency in the regime will remain. This has a strong effect on the ultimate tax rate paid by employees, and has been one driving factor behind the rapid reductions in CO_2 emissions seen especially for business vehicles in Figure 14.

4 The tax falls on the individual; however, companies would be expected to compensate for this in remuneration to take advantage of the arrangement.
5 SMMT new car CO_2 report, 2015

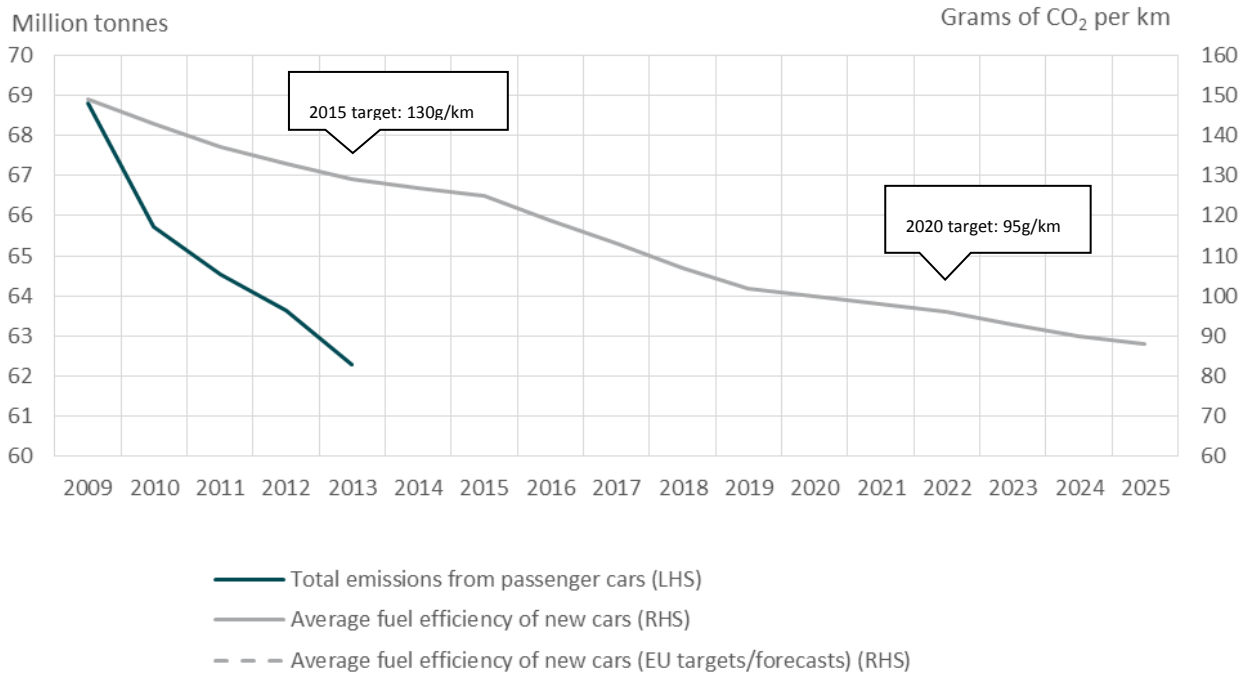
3 Environmental agenda

This section focuses on two distinct environmental issues: firstly, climate change which focuses on CO_2 emissions. Secondly, local air pollution in cities, which focuses on particulates and NOx emissions. For both issues, the total pollution depends on emissions per car and the total miles travelled.

3.1 CO_2 emissions per car

So far, the UK motoring policies via both regulation and fiscal policy has been very effective in pursuing its environmental agenda, particularly considering CO_2 emissions of new cars (see Figure 11). The UK met the 2012–2015 EU target for new cars of 130g/km in 2013, two years ahead of schedule. The current average is 124.6 g/km.[6] The EU will continue tightening the targets: by 2020, the average emission is scheduled to be a far lower 95 g/km.

Figure 11 – CO_2 emissions of new cars and of entire UK fleet



Source: SMMT New Car CO_2 Report 2014, OBR/DfT projections for fuel efficiency (OBR Fiscal Sustainability Report, July 2014). NB: OBR assumes flexibility around 2020 target.

The main drivers of lower CO_2 emissions so far have been:

1) EU regulation leading to steady improvements in efficiency of conventional vehicles[7],
2) a shift towards diesel cars,
3) incentives provided by the VED regime and other fiscal incentives
4) better-informed consumer choices – labelling, campaigning, trialling, demonstrating

6 Society of Motor Manufacturers and Traders, *New Car CO_2 report 2015.*
7 'Conventional' here refers to any internal combustion engine (ICE) vehicle.

And emissions have been offset through

5) biofuels.

Some of these measures focus on the producer side while others on the consumer side. On the consumer side, these can be categorised as “push”, “pull”, or “nudging” behaviours. Measures either penalise consumers for choosing polluting vehicles, or they incentivise consumers to choose clean vehicles, and alternatively they “nudge” consumers into choosing slightly cleaner models than they would have done, thereby shifting consumers along a greener supply chain.

1. EU-level regulation on CO_2 emissions

Regulation has been the main driver of progress to date in terms of reducing CO_2 emissions (see Figure 11). The European Union imposes fines on carmakers whose fleet emissions on average exceed the set targets. This fine amounts to €5 for the first g/km of exceedance, €15 for the second g/km, €25 for the third g/km, and €95 for each subsequent g/km. From 2019, the cost will rise substantially, at €95 from the first gram of exceedance onwards.

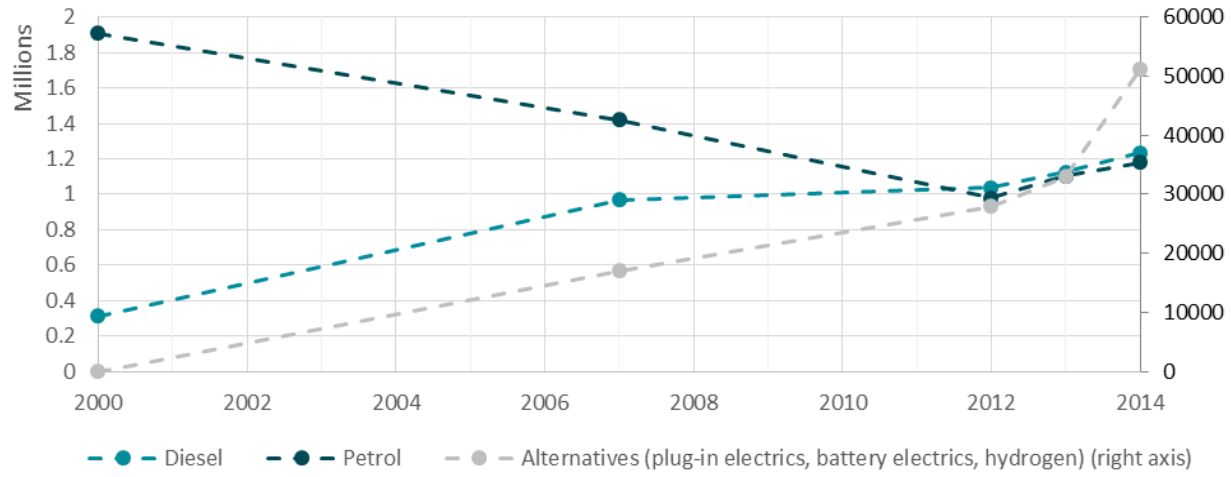
The regulatory regime uses additional mechanisms such as “super credits”, meaning that each ultra-low emissions vehicle counts as three when calculating the average emissions of the fleet. “Eco-innovations” are another tool: any manufacturer introducing an innovation which lowers emissions significantly qualifies for a reduction of up to 7g/km in the official calculated average for its fleet. One example is LED technology which was able to reduce headlight energy consumption significantly.[8]

2. Shift to diesel

From being overwhelmingly dominated by petrol models, there are now marginally more diesels than petrols sold in the UK car market. This is gradually changing the composition of the UK motorparc. The diesel model’s advantage lies in fuel economy, which is higher in like-for-like comparisons.

8 European Commission, 2013. ‘Commission approves first eco-innovation for passenger cars.’ http://ec.europa.eu/clima/news/articles/news_2013031301_en.htm

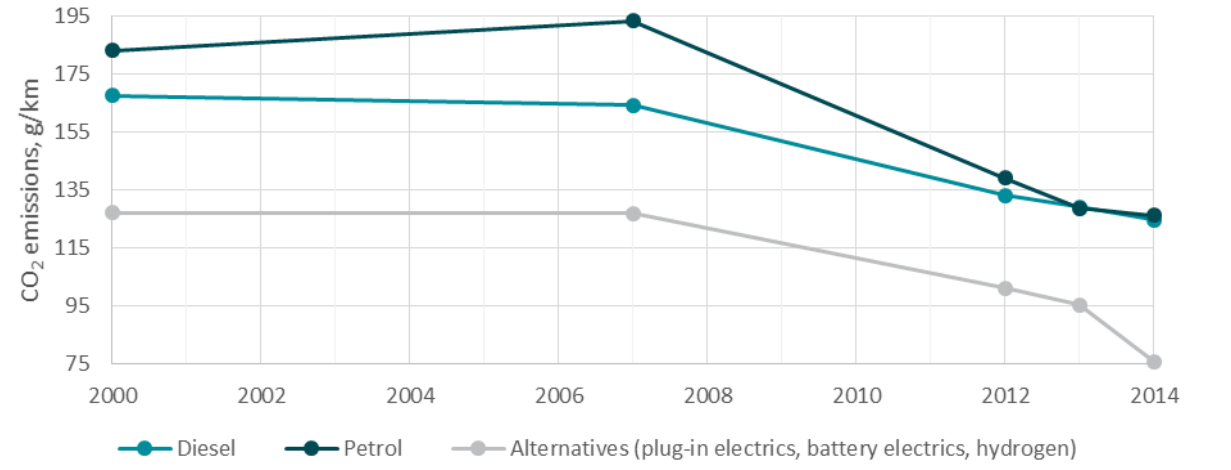
Figure 12 - Diesel overtakes petrol in UK new car sales



Source: SMMT New Car CO_2 Report 2014

The drive to reduce CO_2 emissions has led to diesels replacing petrol cars, especially at the larger end of the market, while at the smaller end there are many petrol hybrid cars and many small petrol models. As a consequence, the CO_2 emissions of an average diesel car are now similar to those of a petrol, despite the latter being substantially less efficient on a like-for-like basis. On this basis, diesels are between 1% and 28.5% more efficient than petrol vehicles. Since diesels are more prevalent among large cars, the difference in reality is smaller: in 2014 the average petrol car emitted 126.5 g/km and the average diesel emitted 124.9 g/km. For comparison, alternative fuelled vehicles (AFVs) emitted 75.9 g/km. Note that AFVs comprise a range of different technologies, from hydrogen to plug-in and all-electric hybrids – see section 2 for more on technologies.

Figure 13 – Petrol CO_2 emissions come down faster, leading to convergence in fuel economy



Source: SMMT New Car CO_2 Report 2014

The shift to diesel has however led to adverse outcomes elsewhere. While CO_2 emissions are lower, diesels emit more pollutants of different kinds, of which the most concerning are particulate matters

(such as PM2.5, PM5, PM10, etc.) and nitrous oxides (NOx) found in exhaust fumes. These are particularly damaging in urban areas, as particulates are associated with respiratory problems and certain cancers.

European Commission standards on air quality[9] set limits for concentrations of particulates and NOx. In the UK, London is the city most affected by the problem, and has had to push back the date by which it expects to meet the target on NO_2 from 2010 (the original date set by the EC legislation) to 2025. Though it was in breach of targets relating to other pollutants, it has now attained them for all except NO_2[10]. Other areas such as Greater Manchester, the West Midlands, Merseyside and Glasgow are expected to meet the limits by 2020. London is currently in breach of EU standards regarding NOx concentration levels, raising wider concerns around air pollution and the role of VED in addressing emissions beyond just CO_2.

However, the nature of the air quality problem (concentrated in urban areas) suggests that it is not amenable to a national-level (motoring tax based) solution. The £100 million being allocated for issues related to air quality in the national Roads Investment Strategy is firmly focused on issues to be tackled locally. There is clearly scope for national guidelines on application of local measures. To generally penalise diesel vehicle users/owners outside of local hot-spots would create perverse incentives from a CO_2 emissions point of view. More effective would be local measures, based around local concepts like London's ultra-low emission zone, a charge from 2020 of £12.50 on the most polluting cars entering London's congestion charge zone (vehicles meeting European emission standards Euro 4 for petrols and Euro 6 for diesels will be exempt). The ultra-low emissions zone also presents a chance to incentivise clean auto technology while improving air quality. A small change to this policy, which would apply the latest Euro-6 standards both to petrol and diesel vehicles, could incentivise buying of cleaner petrol cars as well as cleaner diesels, achieving better results on both fronts.

3. VED incentive regime and other fiscal incentives

A 2015 study by Gerlagh et al[11] looks at the impact of motoring taxation on consumer car purchase decisions throughout Europe. Since several EU countries have pursued similar policies to the UK of "greening" their annual car tax, the authors were able to model the relationship between the extent to which taxes penalised emissions and the reduction in emissions.

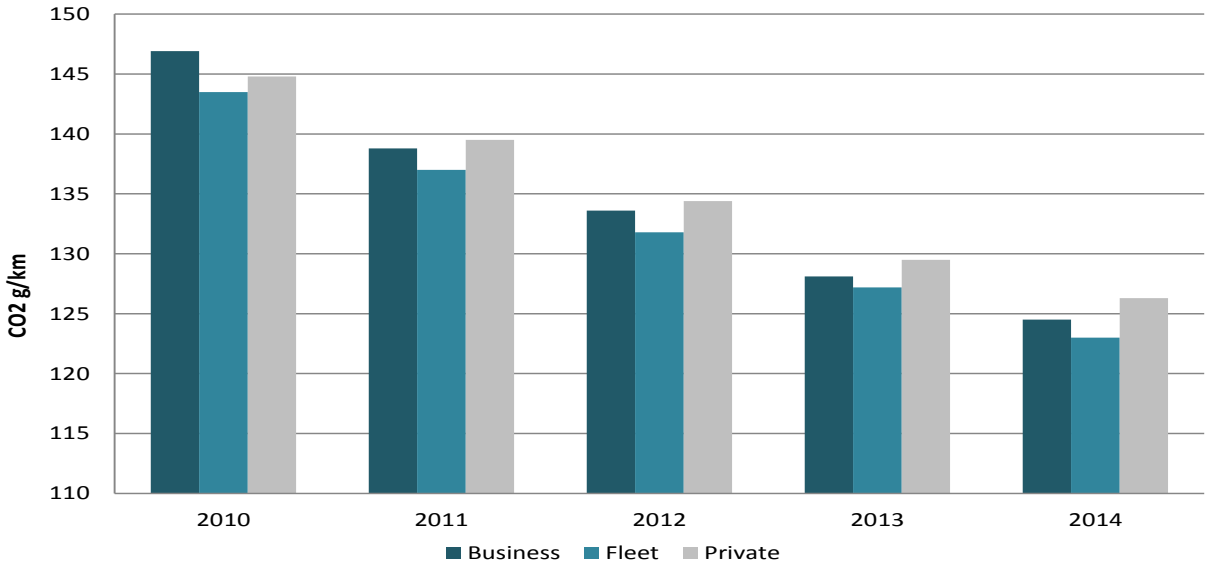
Gerlagh et al found a positive relationship between purchase/registration taxes and efficient vehicle choice. Fuel taxes also have the same effect, but annual vehicle taxes such as VED do not.[12] This suggests that the UK's 2010 "showroom tax", which in some cases almost doubles VED in the year the owner buys a car, has been effective, but that the earlier VED reforms such as banding and differentiation by emissions had a more marginal effect. This is consistent with much behavioural research that suggests individuals place little weight on future costs. The impact of this on the vehicle market is discussed in later sections.

9 European Commission, Directive 2008/50/EC, http://ec.europa.eu/environment/air/quality/legislation/directive.htm
10 Transport for London, Ultra Low Emission Zone, http://www.tfl.gov.uk/modes/driving/ultra-low-emission-zone?cid=ultra-low-emission-zone#on-this-page-1
11 Gerlagh et al., *Fiscal policy and CO2 emissions of new passenger cars in the EU*, 2015
12 There is even evidence of a *negative* effect between annual car taxes and purchase of more efficient cars. This may be a statistical artifact, and the authors do not offer an alternative intuitive explanation.

On the assumption that VED plays a role, and it is likely that the first-year payment does, this would be through a "nudging" effect whereby consumers shift down by one band, rather than buying an entirely different car in order to make large savings. In this sense, VED is a modulating device while the stronger regulatory influences drive the emissions reductions. The Committee on Climate Change judges it "questionable whether the sums involved are sufficient to significantly affect choices".[13]

While uncertainty over the regime's efficacy applies to private users, Figure 14 shows that business users are much more price-sensitive. Since 2010, the relationship between efficiency and VED liability has been strengthened, with higher bands such as L and M becoming more expensive while bands A–C have not changed. All users have reduced CO_2 emitted per kilometre, but business users' CO_2 emissions falls markedly more rapidly than private users.

Figure 14 - Mean CO_2 emissions by sales type



Source: SMMT

The Office for Low Emissions Vehicle also continues to play a role in providing incentives for those cutting their carbon footprint. Just last month, fleets were encouraged to reduce emissions via an extension of the electric van grants. Similarly funds of around £45 million are in place to help rollout ultra-low emission taxis across the UK. An additional £30 million investment is being placed into low emission buses and a shortlist of 12 Go Ultra Low cities aim to support efforts to improve air quality and establish the UK as a global leader in the uptake of ultra-low emission vehicles.

A further tool is "feebates" – a combination of fees on relatively inefficient vehicles, with rebates on more efficient ones. Across Europe, governments have utilised feebates as a fiscal policy tool to encourage consumers to purchase and manufacturers to design more efficient, lower emission vehicles, in turn supporting growth in the automotive industry. Which motorists pay and which receive benefits depends on vehicles' CO_2 emissions, with rebates producing revenues, having neutral impacts or providing net subsidies.

13 Committee on Climate Change, *Meeting Carbon Budgets – 2014 Progress Report to Parliament*

France for instance, offers an emissions-linked purchase tax/subsidy on new vehicles worth from -€1,000 to +€2,000. This system works in the interest of French manufacturers who often build smaller, more efficient cars. Chile operates a similar system, except it has a constant CO_2 price rather than a step function. In Austria, the bonus-malus system accounts for various emissions and is additional to a fuel consumption tax. In Belgium, various schemes apply based on the region – for example, in the Walloon region, a CO_2 based bonus-malus is added to the standard registration tax (based on fiscal horsepower). In Denmark, in addition to a high tax based on vehicle purchase price, a CO_2 based correction is also applied.

While sounding promising, feebates may not be as effective in the UK due to the larger automotive industry, its many niche and large scale premium and luxury car producers and its far greater export base. As companies invest in new technologies and refocus towards electric and alternative fuelled vehicles, this may better align with the UK government's environmental strategy, opening up possibilities of new fiscal policies.

4. Consumer awareness – labelling, campaigning, trialling, demonstrating

Consumers are now well informed of the rationale behind reducing emissions. The most pressing challenge is creating acceptance of electric vehicles, since this will be an important driver of further efficiency gains as the scope for further reduction of conventional emissions narrows.

Countries that have made substantial progress in increasing the proportion of ultra-low emissions vehicles in their fleet have used several measures, including rebates and in-kind benefits. Demonstration campaigns to raise awareness have helped to drive this: for instance, the Netherlands, which has the second-highest concentration of electric cars in Europe, had a successful awareness programme involving test-driving opportunities.[14]

The Office for Low Emission Vehicles campaigns to raise awareness of vehicle efficiency and particularly to encourage the uptake of ULEVs. It engages in many activities to promote these; for example, on the consumer awareness front, the Office runs the "Go Ultra Low" campaign which focuses on vehicles emitting less than 75g CO_2 per kilometre. This presents consumers with the range of ULEVs, allowing them to choose whichever vehicle suits their needs.

Labelling is another tool used to inform consumers. The UK has required vendors of new cars to display colour-coded labels since 2005, with bands from A to F designating the vehicle's efficiency. This is similar to the mandatory labels used for many consumer durables. From 2009 the initiative was extended to used cars.

5. Biofuels

Biofuels reduce the environmental impact of burning hydrocarbons through offsetting the CO_2 emissions as the crops grow, i.e. before the fuel is burnt. Running a car on biofuels still releases CO_2, meaning their impact in reducing emissions does not show up in Figure 11. It does, however, show up when total

14 Committee on Climate Change, *Meeting Carbon Budgets – 2014 Progress Report to Parliament*

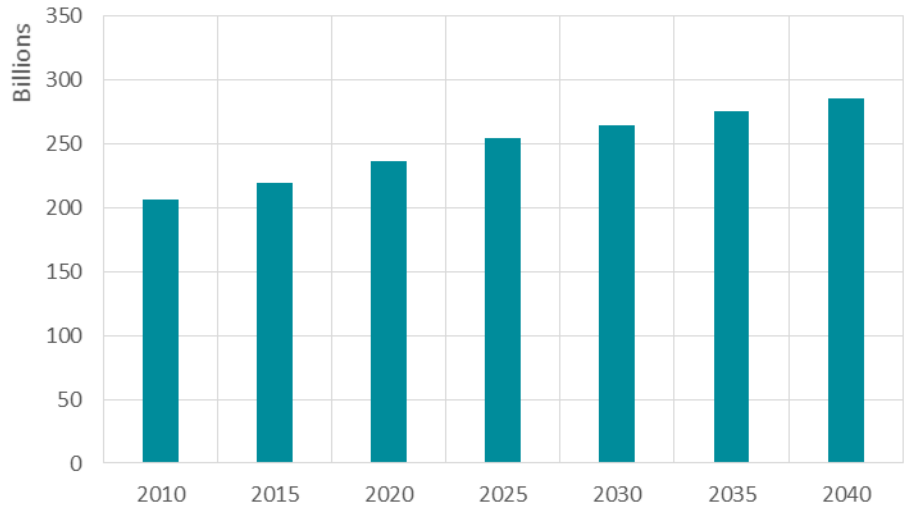
economy-wide emissions are considered, because the farming of the crops produces a net reduction of CO_2 levels, which can be thought of as negative emissions. Currently, most petrol and diesel sold at the pump is a blend of biofuels and conventional fuels. This was driven by the EU's Renewable Transport Fuel Obligation (RTFO), which mandated that fuel suppliers use at least 4.75% renewable sources in the fuel mix.[15]

The Automotive Council has produced a roadmap that anticipates a gradual increase in the amount of biodiesel in the diesel fuel blend if the UK is to meet its obligation under the Renewable Energy Directive (RED) and Fuel Quality Obligation (FQO).[16] While biofuels have a material role to play, it has not yet had a significant impact, suggesting that the government must take a policy lead via the RED and the fuel quality obligations. Petrol will move from the current <E5 blend (meaning <5% ethanol, >95% petrol) to E10 (10% ethanol) which will be phased in from around 2017, and eventually move to E20+ around 2030. Currently biodiesel is <B7 (meaning <7% biodiesel, >93% petro-diesel) but by around 2023 it is expected to include higher proportions.

3.2 Total distance travelled

The Department for Transport publishes forecasts for the total distance travelled by cars each year and forecasts that they will rise steadily. The total emissions from cars can only fall if the CO_2 emitted per kilometre falls more quickly than the total distance driven rises.

Figure 15 - Total miles travelled, 2010–2040



Source: Department for Transport Regional traffic forecasts (scenario 1)[17]

The five trends above have led to significant reductions in CO_2 emissions per kilometre and in total CO_2 emissions. They will continue to produce overall reductions, on most forecasts, for CO_2 emissions. However, the scope to make further progress on emissions with conventional engines is limited, and the

15 Department for Transport (2014), UK experience of the Renewable Transport Fuel Obligation (RTFO) and policies to promote the development of waste-derived and advanced biofuels, http://www.biofuelstp.eu/spm6/docs/jonathan-hood.pdf
16 Automotive Council UK (2015), Energy & Fuels Road Map
17 This assumes GDP, population growth and trip rates continue at their long-run trends.

incentive regime will also need adaptations to produce more CO_2 reductions. So far, the VED regime has played a relatively minor role, as explained above.

Essentially, in the long term further environmental progress by passenger cars will require a shift to alternative fuel vehicles, with a firmer uptake of electric vehicles and ultra-low emission vehicles in the mix and a shift to more appropriate and better management of road space and use. In the short to medium term to 2020, improvement in the CO_2 emitted from road traffic are likely to come from further improvements to the CO_2 performances of conventional vehicles, switching to smaller vehicles, more use of biofuels in the fuel mix and perhaps some nudging to local demand management and/or integrated transport strategies.

4 Fairness

Another important consideration for motoring taxation is which groups of motorists should shoulder the burden. It is important that this should not differ arbitrarily between groups, and that any measures which end up targeting particular vehicles or groups have a strong evidence base for doing so.

4.1 Older versus newer cars

The burden of vehicle excise is shifting steadily towards older cars, as the CO_2 emissions of newer cars continue to decline. Two-thirds of new cars now pay no VED at all. In addition to the issue of tax sustainability discussed earlier, this raises issues of fairness. Is VED becoming more regressive, i.e. increasing the burden for lower income groups?

The British Car Auction (BCA) 2013 used car report contains information on different motorist groups' main considerations when buying cars. It finds that when considering the market as a whole, price is the main driver for used car buyers. However, the income split is clear, with wealthier drivers preferring used cars for reasons such as make and model rather than price, which is the key consideration for those in poorer groups.

This creates a trade-off between two desirable qualities in taxes: the principle that those able to pay more should pay more, versus the principle that taxes should correct market failure, i.e. incentivise drivers to reduce CO_2 emissions. To the extent that richer individuals are also more likely to buy larger, more polluting cars, these goals are in alignment across new cars (albeit certain very clean new cars can also be expensive). This is reinforced by fuel tax, which falls more directly on pollution. But where the cheapest cars are also the most polluting, which applies to used versus new cars, the goals are difficult to reconcile.

The UK vehicle scrappage scheme, introduced in 2009, may have helped in this respect. This fund of £300 million was made available for car owners, who became eligible for a £1,000 bonus from the government and a further £1,000 from the manufacturer, provided their old (10+ years) car was scrapped. Although the scheme had no explicit environmental provisions, it encouraged motorists to trade older cars for newer ones which on average would have reduced CO_2 emissions, and provided a valuable fiscal stimulus at a time of recession when demand was hugely weakened. Further, a flat fee is worth more for poorer motorists than better-off ones. However, although it is unlikely that the scheme will be re-launched now that the economy has returned to growth, the policy may have a local or national rebirth linked to environmental outcomes where accelerated exit of older and more polluting cars is seen as necessary to help achieve particular local outcomes on air quality for certain vehicle types. Also, policies may be linked to private-public partnership initiatives and where funding and financing could be enveloped within leasing and value-in-recycling programmes.

4.2 Petrol versus diesel vehicles

The London ultra-low emission zone (ULEZ) proposes to charge non-compliant vehicles entering the congestion charge zone £12.50 per day, in order to reduce emissions of NOx and particulates in London from 2020. While this introduces differential taxation between motorists in different parts of the

country, there is little gain to be had from charging other motorists for a problem which mostly affects urban areas in the UK. Diesels have the advantage of lower carbon emissions, and so a policy which discourages them in all areas would be inappropriate.

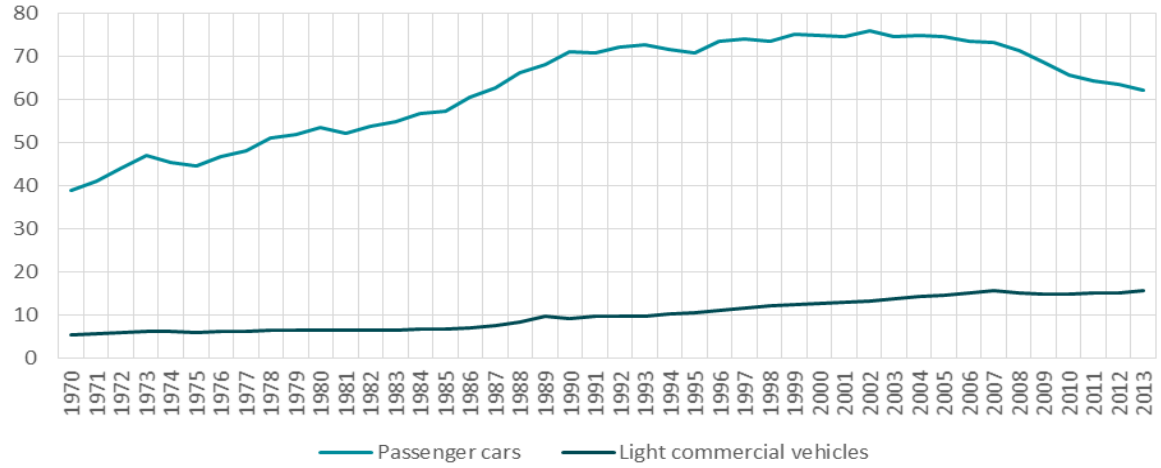
While laudable as a policy, the ULEZ definition of compliance makes a distinction between diesels and petrols which exempts petrol cars from the highest standards. Diesel cars entering the zone will have to comply with the highest Euro-6 standards, while petrols will only be subject to Euro-4, due to diesels emitting more NOx and particulates. European emission standards are different for diesels and petrols: each set of standards since Euro 2 allows diesels to emit more NOx than petrols and still comply, hence London's decision.

However, modern diesels, unlike older models, are comparable to petrols in their particulate emissions. Further, it means London motorists face a difficult choice, in that if they bought a diesel to reduce their VED liability, they will now lose out through being liable for the ULEZ charge. This reduces the incentive for motorists to buy the latest petrols, and therefore reduces the incentive for manufacturers to invest in the development of them.

4.3 Light commercial vehicles

Vehicle excise duty also applies to light commercial vehicles (see section 1). Currently, VED rates for LCVs are not graduated on a CO_2 basis, rather on two bands based on a cc value of 1.54p, meaning there is little incentive through VED to minimise CO_2 emissions for van owners. Arguably this discrepancy should be rectified. Meanwhile, these emissions have increased rapidly over recent years as the LCV parc recorded very robust and near-sustained growth, bar a slight decline during the recession, while car emissions peaked in 2002.

Figure 16 - Total emissions from LCVs, million tonnes CO_2 equivalent[18]



Source: Department of Energy and Climate Change

18 Some emissions produced by burning hydrocarbons are greenhouse gases other than CO_2, such as methane. CO_2 equivalent (CO_2e) measures the total impact, denominated in CO_2 terms.

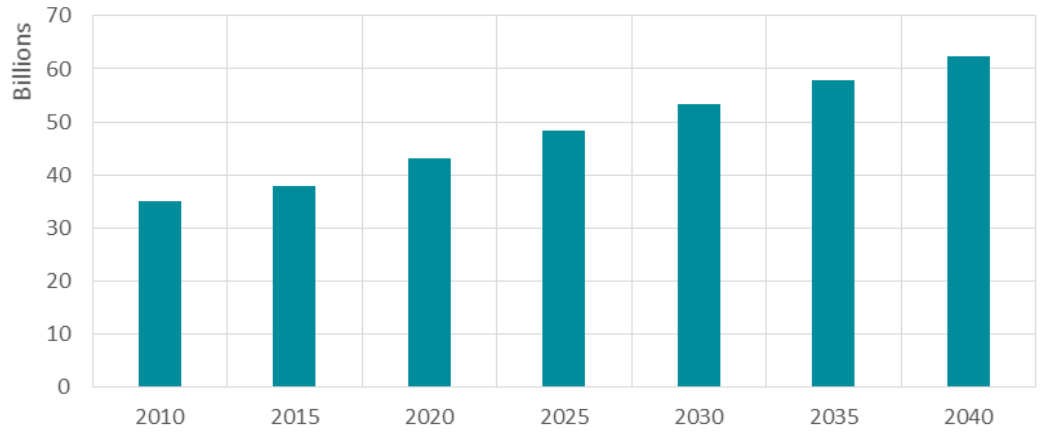
The fact that these are commercial vehicles introduces additional considerations. Generally, economic theory discourages the taxation of factors of production, such as labour or capital (of which commercial vehicles are an example). That would act as a disincentive for economic activity and reduce efficiency. In practice, factors of production are often taxed, but more lightly in recognition of this. However, clearly some reduction of vans' contribution is necessary if it is not to undermine the improvement made to cars' environmental impact.

Currently there is no graduation according to CO_2 emissions, only the weight of the van. While van owners may not be flexible regarding the weight of their vehicle and the load it can carry, they can still be incentivised to choose the more efficient model in that class.

The average CO_2 emissions per kilometre of vans in the UK are higher than the EU average by about 6%, although UK emissions have declined faster over the past five years.[19] This is partly down to weight, which is around 4% higher, but even for the same weight UK vans are less efficient.

Nevertheless, UK LCVs are likely to meet the target for the average CO_2 emissions, but increasing volumes of LCVs mean that the total emissions will continue to rise. The Department for Transport expects total kilometres driven by vans to increase by 24% by 2020 and by 79% by 2040 on 2010 levels. This is more than double the percentage increase for distance travelled by cars over the same timeframe.

Figure 17 - Total LCV distance travelled, 2010–2040



Source: Department for Transport Regional traffic forecasts (scenario 1)[20]

Currently, one in ten vehicles is a van. The recent increase in distance travelled (8.0% between 2010 and 2013, compared to 6.3% for cars) is partly due to a pickup in economic activity, but also structural influences such as a shift from traditional to online shopping, meaning more shopping is delivered by LCVs rather than customers driving their cars. Restrictions on heavy goods vehicles in London have also encouraged a substitution towards light goods vehicles.[21] However, to date there is no solid evidence on the drivers behind this trend.

19 ICCT, European Vehicle Market Statistics 2014
20 This assumes GDP, population growth and trip rates continue at their long-run trends.
21 RAC Foundation, Van travel trends in the United Kingdom, 2014

5 Conclusions and recommendations

5.1 Conclusions

VED has played a key role as a signal to reduce emissions while encouraging the development and manufacture of fuel efficient vehicles as well as environmentally friendly choices on vehicle purchase and lease-ownership. It has proven to be both a successful and effective fiscal tool, commonly understood, accepted and regulated in many forms across Europe as a whole. In recent years, the motoring taxation system has continued to adapt, with greater differentiation of VED bands reflecting and recognising market trends and with rates rewarding choice to newer and the most CO_2 efficient cars. Also, its rating values have continued to set clear increments for standard and new cars across the entire range of car types and their varying levels of CO_2 efficiency.

The introduction of higher first-year rates for some car types has not increased total revenues from new cars. The positive consequence of manufacturers supplying and consumers choosing ever-lower carbon-emitting vehicles is less supportive of revenue raising and this is set to become more acute over the longer term. Based on current trends, unless regulators choose to alter the regime in the near future, government revenues from VED will decline to unsustainable levels, given that a total real revenue-take up of up to £6bn is viewed as necessary if fuel duty revenues weaken. Therefore VED reforms will be necessary to meet EU targets for CO_2 emissions. Promisingly, complementary policies are available to help sustain shortfalls in revenues and to continue development of technologies, bolstering growth and employment in the automotive industry.

At present, around two-thirds of new vehicles registered are not liable for VED, and this proportion is set to rise as further progress is made on both conventional vehicles and also via increasing the stock of alternative fuelled and electric vehicles. In a sense, this is a sound development for road transport-based environmental policy – road transport emissions are declining and are forecast to continue doing so. The shift towards diesel and EU-level new car regulation has placed increasing pressure on manufacturers and consumers alike to move towards meeting environmental targets; these have been the active ingredients in the mix. However, the new car graduated VED system has complemented the roles played by these factors. In addition, government incentives in the form of grants e.g. Plug-in car and van grants for electric vehicles and substantial discounts in the company car tax regime have raised the attractiveness of ultra and zero emissions vehicles as viable and sustainable choices.

However, whilst all stakeholders in the UK car market can recognise the significance of the achievement in trends to date, it has halted and eroded total real government revenue take from a significant tax base. Adjustments or reform of the motoring tax regime is necessary if this revenue stream is to be protected. Importantly, the government also has a multi-faceted responsibility to support domestic industrial and manufacturing interests, while encouraging a strong export base and global automotive trade.

From an industry perspective, manufacturers appear sympathetic to the need for change, although many advocate modest change rather than an overhaul of the entire motoring tax system. It is evident that forward guidance of policy is welcomed, alongside transparent changes being clearly signposted in

advance, to enable the UK's large and successful vehicle manufacturing sector to factor reforms into their longer term business and strategy plans.

Automotive manufacturers call for changes to build upon the aspects of VED that have worked well in the previous regime, but also to include a stronger push into new technologies such as AFVs and electric vehicles which are showing fruition. Much of the previous progress has come from the increased efficiency of conventional vehicles. In the future, this method will encounter diminishing returns and the next phase of emissions reduction is expected to be far more difficult.

As industry continues to invest in research and development and commercialisation of emerging technologies such as autonomous driving and increased connectivity, we can expect the future of transport to change rather rapidly over the next decade. Implementing new and more importantly, sustainable motoring tax policies which are able to encourage the progression into new transport modes, without adversely impacting upon previous policy support becomes increasingly challenging. Sustaining the revenue base, meeting future environmental targets, encouraging industrial supply chain development and growth as well as supporting fair policies for all, will require continual assessment of the regime and modest evolutionary adaptation as necessary.

As part of our research, we consider the possible scope for reforms to VED and whether alternative policies could be better adapted to serve the UK market, noting additional policy considerations and recommendations for further consultation and study. Motoring taxation has been through a period of flux in recent years as VED shifted from a general tax on driving to a tax with environmental objectives. The changes undermined the stability and predictability identified as desirable objectives. However, the VED regime has been broadly stable since 2009 and as discussed in section 1, many of the major vehicle manufacturers in the UK have expressed approval of the current VED regime, particularly regarding the feature of continuity in policies.

However, there is growing if not immediate pressure for some changes given the fiscal pressures faced by government and the need to keep or increase revenue take. This is exacerbated by the way the current structure of the VED regimes' bands and rates has lagged the rapid progress in average new car efficiency. Considering the interests of various groups of stakeholders and the issues that require addressing, we believe that a fundamental reform of VED or the system of motoring taxation in general is not required at this current time. Instead, the current VED system can be restructured to address the declining revenues and better address environmental objectives and targets going forwards.

5.2 Our Recommendations

- **Segmentation of the current top Band A**

Changes to the VED regime could be made to incorporate issues such as air quality and congestion. However, one of the **successful aspects of the current VED regime is its simplicity in that it targets a single objective - CO_2 emissions**, and is structured to send a clear signal in line with this aim. For this reason **we recommend that the VED regime remains graduated solely on the basis of CO_2 emissions at least over the medium term, although we recognise that it may need to evolve to reflect market**

trends and wider policy expectations in the longer term. In line with environmental objectives, the **graduation of VED should reward those choosing to purchase and operate the most efficient vehicles with the lowest rates of tax**. However, the current **Band A, which covers cars between 0 - 100 g/km, is no longer fully reflective of the most efficient cars** in the market and is increasingly moving towards reflecting the norm.

This could be addressed with a gradual evolution of the bands, reducing each band by a few grams of CO_2 per km each year. However, such a system would likely lead to only a few vehicles changing bands over the course of its lifecycle. Additionally, **the choice of the adjustment each year would introduce increased uncertainty in calculating the costs faced by consumers over a number of years**. Currently, with fixed bands the key uncertainty between each tax year is simply to what extent the duty levied on each band increases.

Instead of tweaking the structure of VED bands over time, issues such as reduced incentives from VED and increasing fiscal pressures could be partly addressed by **graduating the top Band A into a series of new bands**. As discussed earlier, **such a move would allow the government to maintain the proportionate size of the tax base over the medium term, while still allowing for incentives, such as zero VED rates, on the most efficient cars.**

These **reforms could also be phased in over time by gradually introducing new VED bands of 10 g/km, slowly reducing the top limit of the current top band A from 100 g/km**. However, these gradual readjustments work against the benefits observed recently from a period of relative stability in the system. Repeated changes to the structure may confuse consumers' understanding and acceptance of the VED labelling system and overall regime. Additionally, the **difficult changes to relative rates required when introducing new bands would have to be repeated on a number of occasions** in the coming years.

The **current company car tax system provides an effective template for such a reform**, with cars with CO_2 emissions up to 100 g/km classified into more bands (one of which refers specifically to zero-emissions which are currently exempt from VED). However, **to maintain simplicity, we would suggest that the number of new bands be minimised, with three groups (0-50 g/km, 51-75 g/km, 76-100 g/km)** appearing to be a simple solution while still providing some policy flexibility. As raised in the fairness section of our report, such VED reforms coupled with more stringent writing down allowances may prove to be more challenging for premium automotive manufacturers that are unable to meet lower emission levels.

As with the introduction of the 13 band system, the **key consideration is the restructuring of the associated relative rates**. Our analysis in Section 2.1 suggests that **extending the tax base to include all cars with CO_2 emissions of 50 g/km or above would more than maintain the current tax base in 2025**. **This would reduce the average real increase in rates required to maintain revenues from VED in real terms to £67 by 2025**.

While these required increases could be spread evenly across the bands, **the current system lacks significant differentiation below 120 g/km**. Given that environmental targets at the EU level now shift towards levels below 100 g/km (95 g/km in 2020), th**e points at which incentives provided by the VED**

system are strongest need to be lowered accordingly. As such, while the new bands may raise tax revenue, they should bear less of the real increases required to maintain the revenue stream. **Rates above 100 g/km, and particularly bands B and C which currently attract relatively low annual rates, should see the largest increases in the period**. **However, given development and lease cycles it is important for both manufacturers and consumers that these changes are announced well ahead of time and phased in gradually over a number of years.** Changes to the VED regime may challenge some automotive manufacturers more than others. Some manufacturers may prefer gradual proportional changes across all bands, especially if they are unable to utilise new technologies to reduce emissions or to make the transition to smaller and alternatively fuelled vehicles.

The almost doubling of VED in the top band A in the first year, the so-called **"showroom tax", has also been shown to be a reliable tool for influencing consumer choices**. While higher upfront tax would be a stronger signal in this regard, **the need to balance against industrial interests suggests the current compromise is suitable, only requiring adjustments in line with potential changes to band A**. Again, it would be advisable that these changes, particularly **the introduction of first-year rates to previously uncharged bands such as B, C and D, would be phased in over a timeframe of a couple of years** so that manufacturers and consumers have adequate time to adjust to the changes. Importantly, fairness considerations highlight that while a gradual and proportional rise across all bands may prove to be more amenable to premium automotive manufacturers, pivot points must be identified to encourage nudging of all consumers across the supply chain continuum into more efficient cars.

- **Introducing a new system for LCVs which graduates vehicles by CO_2 emissions**

Given that the current system of VED applied to LCVs does not explicitly graduate vehicles by CO_2 emissions, the need for reform is not driven by the fiscal agenda. However, as a growing market segment, **the environmental agenda could be better addressed by introducing a system for vans that graduates by CO_2, as is currently the case for the car market**. This need not be a revenue raiser – it could be revenue neutral – but it appears necessary if policy is to further raise awareness and signal the most efficient choices for businesses using vans.

Often, **incentives built into the tax system tend to have a bigger impact on shaping the decisions of businesses - reforms that move in this direction could have a beneficial impact on the efficiency of the UK's van fleet**.

When considering reforms to the LCV market, additional considerations are needed with respect to the usage of vans. A graduated VED system structured in the same way as the current system for cars in the UK would lead to those vans with low load capacities attracting the lowest rates and the largest vans attracting the highest rates. As highlighted in the fairness section of this report, **the VED system should not act to discourage particular segments of the van market** in this way.

Many van users may require the full capacity offered by the largest vans in order to sustain business needs. **From an environmental perspective, it is optimal for users to make single trips** in the correctly sized (albeit larger, more CO_2 emitting vans) than having to make multiple trips in smaller vans. As a

result, **a graduated VED system for LCVs should be based upon CO_2 emissions per tonne of loading capacity** in order to control for the impact of vehicle size on emissions.

Such a system would not penalise those end users who require the largest vans available, nor would it encourage users to replace their current vehicle with multiple smaller models. Instead, it **would act to nudge purchasers to opt for the most efficient models within the appropriate market segment as desired.**

- **Additional policy considerations and recommendations for future consultation and study**

While the recommendations above aim to address the current issues facing the VED regime for cars and vans, it is important to remember that **VED has been successful in recent years as part of a wider set of policies and regulation aimed at reducing the levels of CO_2 emissions** produced by the UK's motor vehicles. Additionally, we need to consider that **VED does not seek to explicitly address other issues and objectives such as localised air pollution levels** in the near term, although VED's role may be expanded over the longer term.

VED remains a simple, effective and valuable fiscal instrument – these positive aspects must be maintained even if amendments to the regime are necessary. **Having alternative tools operate in concert with VED will support the sustainability of overall motoring taxation** in the UK. **Policies must consider both a near term perspective** involving adjusting the VED regime as noted above, **as well as a longer term horizon** including technological changes and adaptations to emission testing procedures, when addressing fiscal and sustainability issues.

Given that our recommendations for VED do not represent fundamental changes in its operation or role, **policy will still act to nudge purchasers into lower emissions vehicles**. However, as discussed previously, **stronger incentives schemes will still be required to support the uptake of ULEVs**. The uptake of the current plug-in car grants has grown over recent years and should remain in place until these vehicles are able to compete on cost and become more suitable for the mass market. However, if such a programme becomes financially unviable in terms of government spending, then equivalent value financial support through discounts on use and ownership charges **may offer a solution, having already shown some effectiveness as an incentive in the current company car tax regime.**

With the simplicity provided by the clear objective on CO_2 emissions for the VED regime, it may be advisable to use alternative instruments to address issues such as air pollution. Often, such issues are faced by local areas, rather than on a national scale. Therefore, **localised policy measures may provide the most potent policy tools to address local issues**. Options for these include localised versions of road user charging and implementing standards within specific zones, such as London's ULEZ proposals.

Road user charging has proven to be successful and accepted across many cities, despite initial dissent. Working in conjunction with VED, it provides an alternative option which can be more **easily adjusted to allow for charging during different times of the day (London congestion charging zone), according to differing vehicle emissions (ultra-low emissions zone charges) and also accounting for usage within differing zones/local roads.** Post-election, if greater powers are devolved to local authorities,

regionalised or localised road charging may become an option for those local authorities that wish to adopt ultra-low emission zones. Importantly, **setting out a nationally unified set of guidelines for local authorities may help to provide a consistent system of operation, minimising confusion for road users.** This could be a further area of work, presenting opportunities for consultation.

Alongside VED, **the ultra-low emissions zone provides another opportunity to incentivise clean auto technology while improving air quality**. Amending the policy to apply the latest Euro-6 standards both to petrol and diesel vehicles could encourage purchases of cleaner petrol cars, supporting growth in both the domestic and international automotive markets. To date, EU regulations have been an effective tool and extending regimes which reward both technological innovation and production of ultra-low emission vehicles is likely to generate success in meeting future CO_2 targets. **Further trialling of congestion and air quality zones could provide insight as to whether these are appropriate policies over the medium term.**

Over a longer-term horizon, there must be recognition that **the emergence of new technologies and increased connectivity will support a reduction in emissions and congestion in coming years**. Already we are witnessing a shift away from conventional petrol and diesel vehicles into alternatively fuelled and electric vehicles. Gradual replacement of grants with benefits in kind such as free parking, use of bus lanes and continued congestion charge exemptions may become increasingly necessary to sustain take up of efficient vehicles, especially given the considerable R&D and associated commercialisation costs invested by automotive manufacturers. **An awareness of the extent and speed in which prototypes can be transformed from design to production will also help drive manufacturers' longer term industrial strategies as well as informing future policies which can complement adjusted VED regimes**.

Over the long term, **if economic activity continues to expand, the outlook for public finances will automatically improve resulting in lower borrowing and a reduction in debt**. Future policies may therefore be influenced by a possible reduced need for revenues. If additional revenues were raised, alternative options may be to **maintain revenues for local purposes, possibly hypothecating for local scrappage schemes or to control for localised road traffic or road demand management schemes**.

VED policies and revenues must be viewed in conjunction with other motoring taxes such as fuel duty. We expect that given the substantial revenues gained from fuel duties, this policy is likely to be retained over the longer term and that it will continue to work in conjunction with all other transport policies. Amendments may result in **alternative policies such as national road charging also becoming a very real possibility, particularly if VED and fuel duty policies increasingly lose influence in the wake of new technologies**. Again, we would recommend this as an area of further work to assess its feasibility.

6 Appendix

Modelling of future VED tax revenues

Our forecasts for VED revenues are based on a detailed projection of the UK's stock of cars. This has been developed using data from SMMT's Motorparc service. The primary source of data is an extract taken from the DVLA's registration system but the quality and detail of the data is considerably enhanced by linking to MVRIS data and the SMMT's model tables.

New car sales are forecast using Cebr's projections for growth in real GDP and final consumption expenditure by households. Future parc levels are forecast using population and Cebr's GDP projections and the number of cars scrapped each year is sufficient to maintain these levels. These vehicles are scrapped on the basis of past shares by age of vehicle and are scrapped proportionally across the emissions distribution for each given year of first registration.

The main forecast judgement made is the path of future new car efficiency. Our central assumption assumes that the UK new car fleet marginally meets the 2020 EU efficiency target, which stipulates that average CO_2 emissions across 95% of the fleet must not be above 95 g/km in 2020 (100% in 2021). We also assume that the distribution around this mean is unimodal (i.e. efficiency gains are distributed across the whole of the new car fleet) although adjustments to the overall mean of the new car fleet are made to reflect the growing market for zero-emission electric vehicles.

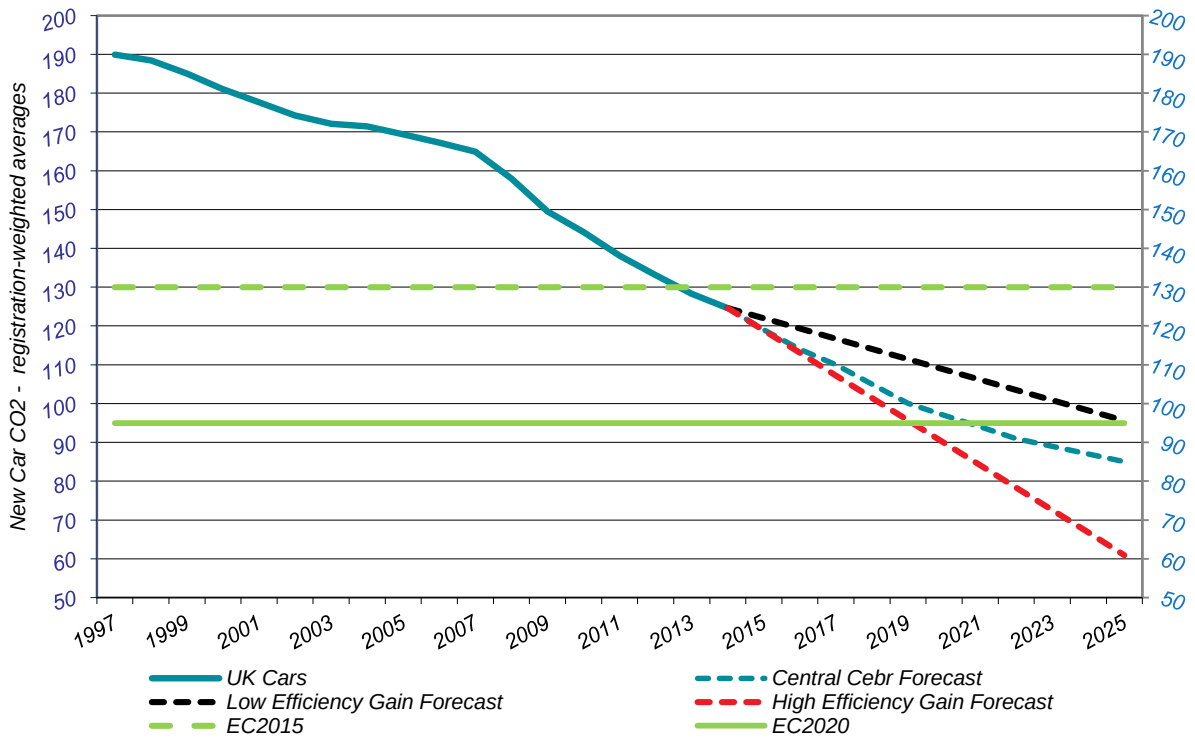
Table 6 – Central efficiency assumptions for the new car fleet

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cebr April 2015 (g/km)	119	114	110	105	100	**97**	94	91	89	87	85
OBR July 2014 (g/km)	125	119	113	107	102	**100**	98	96	93	90	88

Sensitivity of revenue projections to efficiency assumptions

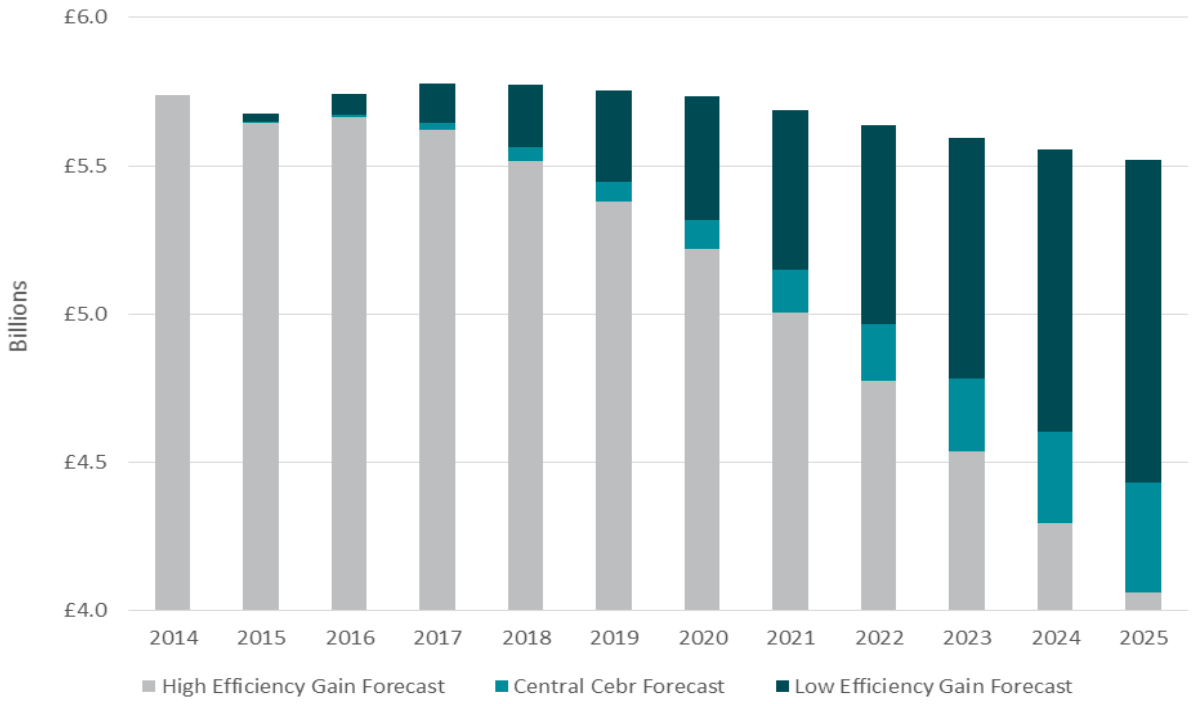
Our low and high efficiency gain forecasts are based on previous trend rates of decline. The low efficiency gain assumes that the trend reverts back to the slower gains in efficiency seen between 1997-2006. On the other hand, the high efficiency gain assumption assumes that the market continues at the average rate of efficiency gain between 2007-2014 throughout the forecast period.

Figure 18 – UK weighted new car emissions



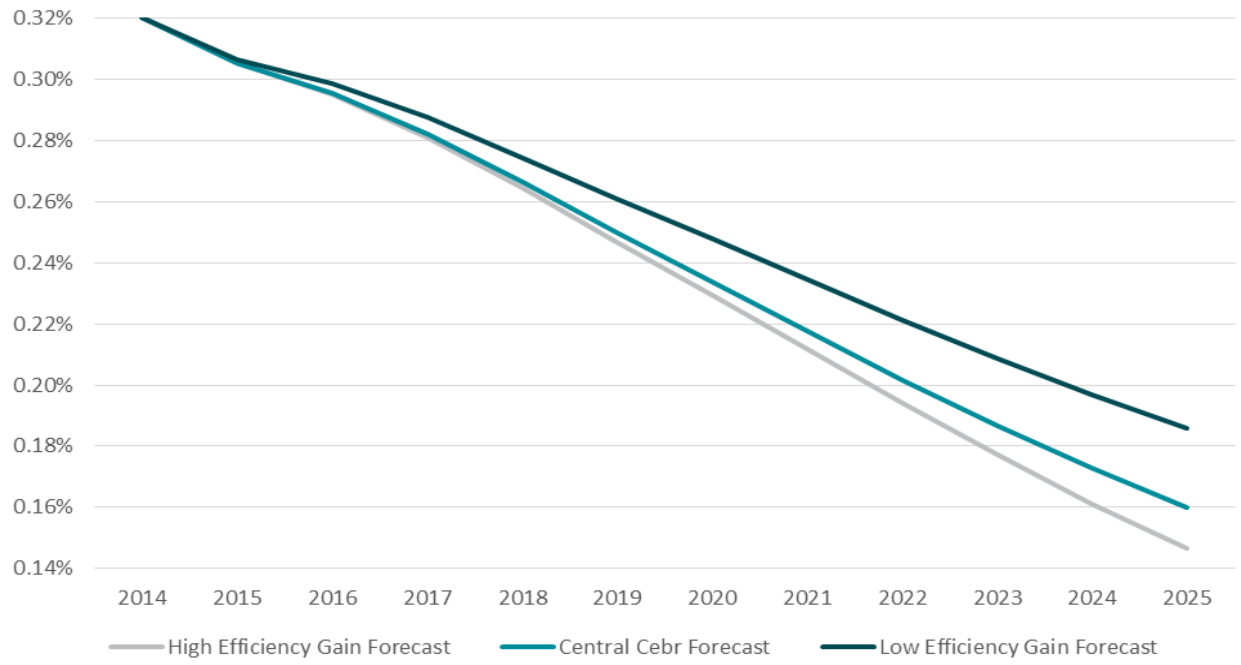
Source: SMMT, Cebr analysis

Figure 19 – VED revenue projections (current prices)



Source: SMMT, Cebr analysis

Figure 20 – VED revenue projections as a share of GDP



Source: SMMT, Cebr analysis