

## The role of company car taxation to promote low carbon vehicle technologies

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### **Abstract**

This paper presents a review of the CO<sub>2</sub> based company car taxation that has been in place in the UK since 2002. One aim of this ecotaxation reform was to promote the uptake of low carbon vehicle technologies, but in practice the tax reform led to the widespread use of diesel cars. With company cars making up 55% of new car sales, this has led to a major shift towards diesel in the UK car stock as a whole.

In 2010 a modification to the company car taxation system was introduced, which provided a step change incentive for the drivers of low and ultra-low carbon vehicles. This change provides a financial advantage over diesel to the low carbon technologies of hybrid and electric vehicles. This paper explores the working and effects of the company car tax system and suggests that the tax structure will particularly favour plug-in hybrids. Indeed, it could well tip the balance to making this the dominant clean vehicle technology, sidelining pure battery electric vehicles and making it difficult for fuel cell vehicles to achieve market penetration.

## 1. Introduction: The Company Car Factor

In recent years over half of new cars in the UK have been purchased by companies for use by their employees for both business and private use (Table 1).

**Table 1: UK Cars registered for the first time, selected years 2001-2010 (Thousands)**

Year	Privately registered		Company registered		Total registered
	Num	%	Num	%	Num
2001	1 369	53	1,216	47	2,585
2005	1 056	43	1,388	57	2,443
2008	858	41	1,254	59	2,112
2009	980	50	989	50	1,969
2010	905	45	1 091	55	1,996

Source: <http://www.dft.gov.uk/pgr/statistics/datatablespublications/>

Company cars thus have a major influence upon the UK car stock, including the overall fuel efficiency and CO<sub>2</sub> emissions from the car fleet. If low/ultra-low carbon vehicles are to be in widespread use, then the company car market is crucial.

Company cars emerged as a form of 'income-in-kind' for middle and senior managers during the early 1970s, when rises in cash income were subject to anti-inflation incomes policy restrictions. Providing cars instead of cash got around these government restrictions. However, companies then realised that the valuation of cars and fuel was so low that this also represented a very effective means of tax avoidance. Thus, even after the anti-inflation incomes policies ended, companies continued to provide company cars, which quickly became part of the pay culture. By 1975 37% of new UK car registrations were in a company name, rising to 40 – 45% in the early 1980s and, as noted above, has continued to grow to 50-60% today.

In the 1980s the main transport policy concern was that the company car taxation regime undervalued the private benefit of company cars and that it also resulted in the purchase of cars with higher fuel consumption than if the individuals had purchased their own car. The 1984 *Company Car Factor* report (Baker et al, 1984) estimated that the undervaluing of company car benefits amounted to an effective state subsidy of £1.8 billion (at 1984 prices) and noted that the average engine size of new company registered cars was 1 610cc compared to 1 340cc for privately registered new cars. The tax treatment of company cars was thus a large state subsidy supporting car use for a high income minority, and which resulted in poorer fuel economy in the car stock as a whole.

The UK Treasury came to recognise this issue, and through the late 1980s and into the 1990s, tax rates were increased on company cars and fuel for private use. By 2000, the tax loophole was substantially closed, but company cars remained engrained in the pay package for UK middle and senior managers. However, although income as cars and fuel was now taxed on broadly the same basis as income in cash, the system was only designed to provide tax equity in an administratively efficient manner. Wider transport policy issues had no influence upon the design of the company car tax system, and indeed it had a number of features that produced adverse transport and environmental impacts.

The method to tax the value of company cars available for private use<sup>1</sup> was for a cash equivalent value to be added to an individual's income for tax purposes. As noted above, the main issue had been that this was a realistic figure. By 2001 the cash equivalent for tax purposes was assessed as 35% of the car's new list price. There were, however, reductions to tax liability related to the amount of business travel undertaken by the driver. The tax charge was reduced to 25% if users drove more than 2 500 miles on business and was cut further to 15% if they drove 18 000 miles on business. There were also tax discounts for drivers of older company cars.

These thresholds for tax reduction were widely criticised as generating unnecessary car travel and CO<sub>2</sub> emissions to cut the individual's tax liability. In the context of growing concerns about the environmental impacts of transport activities, the company car tax system was criticised as supporting the purchase of high CO<sub>2</sub> emitting vehicles that were then driven further to cut tax liability.

## 2. The 2002 Company Car Taxation Reform

By 2000, the UK government had implemented a number of policies to reduce the environmental impacts of transport. The policies implemented by the UK government included a range of measures on vehicle fuel efficiency working towards the current EU regulations requiring average new car emissions to fall to 130g/km by 2015. These policies included changes to the tax regime. For example, in 2001 the UK's annual circulation tax had been reformed to be graded by the car's test CO<sub>2</sub> emissions, with a further reduction for cleaner fuelled cars (for details see Potter and Parkhurst 2005). In April 2002 a major reform of the company car taxation system was introduced using a similar approach, with the car's CO<sub>2</sub> emissions being a key part of determining the cash equivalent of the benefit on which tax is due.

These policy actions can be viewed in the light of the analysis by Gray (2011), who identifies two main views of sustainability policies:

- the marginalist or weak sustainability view
- the radical, structural or strong sustainability view

The former holds that current improvements in such things as taxation, technological efficiencies and improved market mechanisms coupled with voluntary initiatives will steadily swing the capitalist ship around to achieve a more sustainable future. This links in with the 'nudge' philosophy that has attracted much policy attention in the UK (Sunstein and Thaler 2008). The latter view, however, is one that is sceptical of what level of improvement is achievable by the marginalist/nudge approach and that despite improvements in efficiencies, all that has happened is that the trend away from sustainability has been slowed. Such a view would advocate a move towards a less highly motorised society and, rather than seeking to 'green' the company car sector, might suggest that company provided cars have no place in a sustainable transport system.

With the change to company car taxation representing a marginalist approach, it is pertinent to ask what level of change this reform has effected in the sustainability of car use, and what potential it might contribute in the future.

The method adopted in the 2002 company car taxation reform was to weight the new list price of the car by a percentage factor that varies according to the car's test CO<sub>2</sub> emissions. Discounts for high business mileage were abolished, together with most age-related discounts, which had provided an incentive to drive further and to use older, more polluting cars<sup>2</sup>.

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<sup>1</sup> It should be noted that, unlike in most mainland European countries, in the UK commuting to and from work is viewed as private travel. Commuting is not a tax-deductible expense and so the commuting benefit of a company car is viewed as private income-in-kind.

<sup>2</sup> Notably, 'classic cars' are excluded from these (and also certain other tax) provisions, and a minority effect has been to encourage the ownership of such cars as company vehicles. They are by definition old, and generally produce high levels of emissions.

So, for example, a car with a new list price of £25,000 and test CO<sub>2</sub> emissions of 152g/km would fall in the 20% band, and so the annual tax benefit would be assessed as:

£25,000 x 20% = £5,000 per annum

For income tax purposes, this sum would be added to the individual’s income and tax paid at the appropriate marginal rate. So if the individual’s cash income took them into the 40% tax bracket, they would pay 40% income tax on the above sum (i.e. £2,000). Table 2 shows the 2011-12 percentage bands.

**Table 2: Company Car price percentage values 2011-12**

<b>CO2 emissions (g/km)</b>	<b>Percentage</b>
0	0%
1-75	5%
76-120	10%
121-129	15%
130-134	16%
135-139	17%
140-144	18%
145-149	19%
150-154	20%
With increases of 1% for every rise of 5g CO <sub>2</sub> per km until:	
220-224	34%
225 and above	35%

This system has been gradually refined since its introduction in 2002. Initially, the charge ran from a base level of 15 percent of a car’s new list price, for cars emitting 165 grams CO<sub>2</sub> per kilometre (g/km), in 1 percent steps for every additional 5g/km over 165g/km to a maximum charge of 35% p of a car’s price. These bands have been adjusted since the system was introduced, particularly to stimulate the use of low CO<sub>2</sub> cars. So, whereas in 2002 the 15% rate was charged on cars emitting 165g/km, today the 15% band is for cars emitting 120-129g/km. It is important to regularly revise the CO<sub>2</sub> tax bands to reflect and stimulate improvements in car fuel efficiency.

There are now also 10%, 5% and 0% bands. Initially cars solely powered by electricity were charged at 9% of their list price, but from 2010 electric cars were rated at 0% and ultra-low emission cars (75g CO<sub>2</sub> or less) at 5%. The 10% band is for low-emission cars in the 76 – 120g range. In general, the revisions since 2002 have resulted in the cleaner fuel technologies being incorporated into a single simplified table based entirely on test CO<sub>2</sub> emissions.

The benefit of free fuel supplied for the private use of a company car user is also weighted by the same percentage for CO<sub>2</sub> emissions as used to calculate the company car taxable benefit. To report the actual amount of free fuel supplied to each individual company car user would be administratively burdensome, and so a generic system of assessment is used instead. This is based on a scale charge (currently set at £16,900); if the company car’s CO<sub>2</sub> emissions places it in the 20% band, the cash benefit of free fuel would be calculated as:

£16 900 x 20% = £3 380

If the employee tax rate were 40% then they would pay £1 352 annual tax on free fuel.

If the employee felt they were not likely to spend £1 352 on fuel for private use of their company car (and private use includes commuting to and from work), then they can opt out of receiving free fuel, and many company car users have done so. The overall proportion of company car drivers provided fuel for private use decreased from 57% in 1997 to around 30% in 2005 (HMRC 2006).

### 3. Impacts of the Tax Change

The new company car taxation system means that car users can cut their tax liability by a large amount if they shift down the CO<sub>2</sub> percentage bands. For example, a 40% tax payer with a £25 000 car, if they shifted from the 25% to 15% band, would save £1 000 per annum.

Initially, the most cost effective and easiest way to do this has been to shift to the best CO<sub>2</sub> performance in class of cars or, in particular, to diesel cars. In 2002 only 30% of company cars were diesel, but this figure rose to 50% in 2004 and is now over 60%. This has resulted in a major growth in the purchase of diesel cars in the UK as a whole (Table 3).

**Table 3: All UK Car sales by fuel type, 2000-2009**

	Petrol	Diesel
2000	<b>87%</b>	<b>13%</b>
2002	<b>85%</b>	<b>15%</b>
2005	<b>79%</b>	<b>20%</b>
2009	<b>74%</b>	<b>26%</b>

HM Revenue and Customs (previously the Inland Revenue) has conducted two detailed assessment studies (Inland Revenue, 2004 and HMRC, 2006). The first study was an initial assessment of tax change. This showed that, average CO<sub>2</sub> emissions of new company cars decreased from 196 g/km in 1999 to 182 g/km in 2002 (the first year of the new system). More recent data from the UK National Travel Survey (shown in Table 4) shows that as well as the cars emitting less CO<sub>2</sub> per kilometre, business distance travelled by company cars is now 45% lower than under old system. This relates directly to the withdrawal of the tax reduction breaks for high business mileage.

**Table 4: Annual Kilometres of Company Cars 1997 and 2009**

	Business	Commuting	Other Private	Total
<b>1997</b>	19 140	9 530	8 920	37 590
<b>2009</b>	10 610	9 480	9 510	29 600

Source of data: UK National Travel Survey Table 0901

The number of business kilometres has reduced by nearly 500 million (over 300 million miles) per year and the overall effect of the change in vehicle type and reduced distance travelled has been to cut the emissions of carbon from the company car fleet by 25,000-35,000 tonnes per annum. This one impact represents around 0.5 percent of *all* CO<sub>2</sub> emissions from road transport in UK.

The effect upon business travel is a one-off, but the impact on the CO<sub>2</sub> emissions on the type of company cars purchased has been ongoing, so the carbon reductions have improved over time. The Stage 2 evaluation report (HMRC 2006), calculated that average CO<sub>2</sub>

emissions figures from company cars were around 15g/km lower in 2004 than would have been the case if the reforms had not taken place. This estimate refers to the impact of the company car tax reform over and above the general reduction in CO<sub>2</sub> emissions from cars in recent years. Overall they estimate that the carbon reduction were around 0.2 - 0.3 MtC for 2005 and may increase to around 0.35 - 0.65 MtC for 2010 and reach a maximum level of savings in the long run of around 0.4 - 0.9 MtC per year towards the end of the next decade.

Rather than being a factor that worsens CO<sub>2</sub> emissions, the research in the 2006 evaluation report stated that if the drivers no longer had company cars, on average, they would choose private cars with CO<sub>2</sub> emissions figures around 5g/km higher.

Overall, the resultant changes suggest that this 'nudge' style reform has had a real and useful impact. This measure has produced substantial reductions in CO<sub>2</sub> from the effect of company cars on the national car fleet and on company cars in operation. Furthermore, this shift to a CO<sub>2</sub> emission-based evaluation was politically and socially acceptable. Unlike some other transport taxation measures, it has not attracted fierce opposition from users and has been generally welcomed as an appropriate reform for environmentally conscious times.

However, this effect has been what Gray classifies as a marginalist or weak sustainability in that the CO<sub>2</sub> emission reduction is not transformative. To achieve an 80 percent cut in CO<sub>2</sub> emissions from cars (as is implicit in the government's ambitious 2050 decarbonising target) requires the widespread adoption of ultra-low carbon technologies, coupled with new practices and travel behaviours (Potter,2007). This has not set us upon such a transformative path.

#### 4. Impact on Cleaner Vehicle Technologies

The conclusion above is illustrated by the fact that, despite the high tax concessions for cleaner fuel vehicles, uptake of these technologies has been very low in the company car market. Even the uptake of petrol-electric hybrid company cars has been small. A closer examination of how the tax charge is calculated helps to explain this. The initial generation of hybrid cars offered little tax reduction compared to diesels, particularly given their higher purchase price. Because purchase price is part of the tax formula, then the high price of a hybrid would counteract any effect of moving into a lower CO<sub>2</sub> percentage band.

For example, if a company car user had the choice between a petrol car costing £20,000 and emitting 170g/k of CO<sub>2</sub>, a diesel car costing £22,000 (145g/k), and a petrol-electric hybrid costing £26,000 (135g/k), then the taxable value would be:

Petrol Car: £20 000 x 24% = £4 800 per annum

Diesel Car: £22 000 x 19% = £4 180 per annum

Hybrid Car: £26 000 x 17% = £4 420 per annum

So, even though the hybrid car is in a lower percentage band, its higher price means that the user would pay more tax compared to a diesel car. In situations where hybrid cars only deliver a relatively small CO<sub>2</sub> improvement over diesel cars, it does not make financial tax sense for company car users to opt for a hybrid. However the situation has recently changed. Firstly there has been the creation of the new 10% band for company cars emitting 76-120g/km of CO<sub>2</sub>. Secondly, there are now more competitively priced petrol-electric hybrids suited to the company car market that are opening up a wide CO<sub>2</sub> gap with diesels. For example the recently launched Lexus CT200h has test CO<sub>2</sub> emissions of 94g/km, placing it in the 10% band, with comparable diesel models in the 17-18% bands. The price of this hybrid is also relatively low (£23 500 in the UK), being only slightly higher than the price of a comparable diesel car. These combined effects mean that, for this class of car, the petrol/diesel/hybrid tax valuation situation has changed to something like:

Petrol Car: £20 000 x 24% = £4 800 per annum

Diesel Car: £22 000 x 18% = £3 960per annum

Hybrid Car: £23 500 x 10% = £2 350 per annum

This change in the lowest emissions band, coupled with technical improvements to hybrids, has given the hybrid technology a major advantage, and it is thus not surprising that Lexus

are particularly marketing their hybrids in the company car market. Current models of the Prius, with CO<sub>2</sub> emissions in the 89 g/km to 92 g/km range, also place them in the 10% band.

This example shows that, to stimulate the uptake of more radical clean vehicle technologies, there is a need for a carefully designed step change in the company car taxation system. As originally introduced, the gradual incremental changes in the UK company car tax system only stimulated an incremental shift in car purchase patterns, largely through a switch to diesel cars. With the recent introduction of the step change for low emission cars, this seems to be leading to the wider adoption of more substantially cleaner vehicle technologies.

Given this tax structure, it seems likely that the company car market could prove to be important for plug-in hybrids<sup>3</sup> when they are introduced from 2012 (many of which will be in the 5% band), although any initial high price may have a suppressing effect. The field is being led by the Vauxhall Ampera and Toyota's Plug-in Prius.

The Ampera, marketed as an 'Extended range EV' to avoid confusion with existing hybrid cars, has a purchase price of £28,995 (including plug-in grant) so its tax valuation would be:

Vauxhall Ampera: £28,995 X 5% = £1,450

So a person on the 40% tax band would pay only £580 tax per annum. The Ampera is an expensive car in its class, but despite its price premium, the tax charge is close to only a third that of a diesel car, giving it a considerable taxation advantage in the company car market.

Pure electric cars (battery electric today and hydrogen in the future) are now in a 0% band, but there is little interest in these as company cars. The barrier seems to be that battery electric cars are not really suited as company cars, which are driven long distances. In the UK the average annual distance covered by company registered cars is 29 600km per car compared with 12 800km for privately registered cars<sup>4</sup>. These longer distances make recharging range an important issue for battery electric cars. The fitness of electric vehicles for the purposes of company vehicles to cover relatively longer distances has been noted as one of the major setbacks in using electric vehicles as company cars. For electric vehicles to be used as company cars as well as in fleets, a much more careful planning of journeys to match with the peculiarities of electric vehicles is required.

It is possible that the very attractive company car tax situation for battery electric cars may attract some niche uptake where other cost advantages may be present (e.g. exemption from the London Congestion Charge or where electric cars are given free parking) and where trip lengths are lower. Even there, the plug-in hybrid looks more likely to succeed.

Hydrogen cars will not be available for several years, with refuelling infrastructure being an important barrier to address. Plug-in hybrids look set to be attractive for the company car sector. They have nearly as much saving as pure electric vehicle (as can be seen from the tax valuation of the Vauxhall Ampera above) with no range/function issues like its pure electric counterpart. As they become available from 2012 onwards, the plug-in hybrid could take off in the company car market. The company car market is so large in the UK (see Table 1), that this could tip the UK as a whole towards plug-in hybrids and marginalise electric vehicles to specialist fleet niches. Indeed it could set in place a dominant design that could make the market entry of hydrogen fuel cell vehicles very difficult.

The widespread use of fuel cell vehicles could be difficult and expensive to achieve. Refuelling infrastructure does not exist presently and this will cost around £2 billion to put in place. Plug-in hybrids do not need any additional infrastructure. Furthermore, the energy losses and CO<sub>2</sub> emissions in getting hydrogen to cars raises serious doubts as to whether this can ever be a sustainable transport solution. With a combination of decarbonised electricity and emerging Biofuels, plug-in hybrids could well represent a long-term low carbon solution.

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<sup>3</sup> Also called 'Extended range EVs'

<sup>4</sup> National Travel Survey 2009

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## 5. Conclusions

Broadly, viewed as a marginalist 'nudge' policy approach, the reform of the UK company car taxation system has been very successful. This measure has produced substantial reductions in CO<sub>2</sub> from the effect of company cars on the national car fleet and on company cars in operation.

An important point is that the 2002 reform was not a single change. The company car taxation framework has been developed and refined, with regular revisions to the CO<sub>2</sub> tax bands to reflect and stimulate improvements in car fuel efficiency, and also the introduction of 'step change' bands to encourage the uptake of radically clean car technologies. These tightening actions are in line with what Bebbington and Larrinaga (2011) indicate as the 'wicked' nature of sustainable development problems requiring that 'solutions' are never permanent but are rather continually reworked.

There have been some 'rebound' responses to the change in the tax structure that should be noted. Some drivers, particularly those who favour large cars, can pay less tax if they opt out of the company car system and instead buy and drive their own car on business, claiming mileage and other car allowances. The tax positions on these other allowances have not been subject to eco-reform and so there is a danger of losing some of the environmental gains. This raises the important point that tax policies on business travel as a whole need addressing rather than just company cars.

There is a more fundamental issue that, however useful these impacts have been, they have not necessarily set us on to a path that will radically reduce carbon emissions from cars. Given UK target of 80% reduction in carbon emissions and 24% of carbon emissions attributable to the transport system (DECC 2010), tax reform of company cars is not really that radical and will not set us on a path to substantially improving transport sustainability. To do that may require more radical system changes to business travel, and probably a substantial reduction in the use of company cars as a whole.

However a significant emerging trend is that the tax structure looks set to particularly favour plug-in hybrids and could well tip the balance to making this the dominant clean vehicle technology. Possibly more by accident than design, this could make sense as the sustainability credentials of hydrogen fuel cell vehicles are increasingly open to question. Because company cars are such a large proportion of the new car market, the tax system could end up setting the UK's technological trajectory.

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