

Carbon reduction, fuel technology and vehicle selection

Fleet decision-making is increasingly dependent on the growing linkage between taxation and the environment. New fuels and technologies now appearing on the market offer potential advantages in terms of tax, cost and emissions. But, as the recent history of LPG shows, a shift of Government focus or technological direction can easily render fleets' choices obsolete.

This bulletin does not set out to identify any particular recommended fuel type or technology. Instead, it gives an overview of current and expected developments in fuels, vehicle technology and 'green' taxation in order to help readers to determine the most important factors to take into account when making decisions.

Climate change and 'peak oil'

Although some dissenting voices remain, there is now wide agreement around the world that climate change, especially atmospheric warming driven by the release of carbon dioxide, presents serious threats to humanity in the coming decades. Similarly, estimates of when world oil production will peak vary from 5 to 30 years. However, almost all experts agree that we will enter an era of dwindling supply and increasing prices for oil. The effects on business, food production and transportation could be no less dramatic than that of climate change.

Green policy

The UK is committed to limiting emissions of greenhouse gases and reducing our dependence on oil. The Government's main fiscal tools for bringing about change are graduated taxes on CO₂, including company car Benefit In Kind (BIK) and Vehicle Excise Duty (VED), and measures that increase the cost of using vehicles, such as increasing the level of fuel duty and enabling local congestion charging zones. At the same time, it is supporting research into new vehicle technologies and has set targets for the use of sustainable alternatives to fossil fuels (e.g. biodiesel and bioethanol).

Fleet Impact

There is already a growing number of incentives for fleets to operate (and drivers to choose) low CO₂ vehicles. They include driver's qualification for 10% drivers' BIK and

exemption from the London congestion charge for cars meeting the appropriate environmental criteria. Fuel costs and CO₂ emissions are directly linked, so the high cost of oil and further fuel duty increases already announced for the period until 2009 will hit the least efficient vehicles hardest.



Low-emission (i.e. low-fuel and low-tax) vehicle options include new ultra-efficient petrol and diesel vehicles; hybrid electric vehicles and cars adapted to run on 85% bioethanol. Prototype hydrogen combustion cars (whose engines burn hydrogen instead of petrol) are already on the road. The first production line fuel cell cars could go on sale in the U.S. by 2009, albeit with a substantial price premium.

These developments are already beginning to have an impact on vehicle and fuel selection. However, when reviewing fuel and technology options, it is important to distinguish between those that seem to have long term sustainability both from an environmental and fiscal perspective.

Remember LPG

The story of LPG illustrates how quickly a solution can turn from a bright hope into a dead end. Low fuel duty and subsidised conversion costs persuaded many individuals and fleets, as well as manufacturers and oil companies to invest in LPG, only to find themselves left standing at the side of the road when the Government's focus switched to renewable fuels. Demand for LPG vehicles and fuel is dwindling, along with the network of outlets selling the fuel. Residual values for LPG and dual fuel vehicles have been affected accordingly.

Biofuels outlook

Biofuel differs from LPG in two crucial respects: firstly it is not made from finite fossil resources but from renewable

plants and food waste, and secondly it can be mixed with conventional petrol and diesel (at specific concentrations) without any need to adapt engines.

The Government is likely to meet its initial target for mixing 5% biofuels into petrol and diesel at all pumps by 2010. Subject to quality and sustainability targets, and agreements with producers and vehicle manufacturers, the 'standard' mix might later increase to 10% or more.

But there are important question marks over the sustainability of biofuels. Forum for the Future, a green think tank, reported in July that the same amount of grain needed to produce a single tankful of ethanol for one large car would feed one person for a whole year. The UK does not have nearly enough spare land to grow sufficient biofuel crops to meet all its transport needs from domestic production.



Although production versions of a few cars are available with engines 'hardened' to allow them to run on 85% ethanol (E85), and drivers of E85 company vehicles will receive a 2% discount on their BIK from April 2008, the fuel itself is currently only sold by a small handful of fuel outlets in the UK.

No plans have been announced for any significant expansion of the E85 refuelling network, so high concentration bioethanol is likely to remain a niche fuel for the foreseeable future.

Biodiesel produced from oil seed crops (which can be used in some diesel cars in higher concentrations – B30 and B100) has fewer sustainability issues than bioethanol but is also unlikely to be widely available until general biofuel sustainability issues have been addressed. In fact, as recently as October 2007, the UN called for a global moratorium on the development of biofuels until sustainability issues are resolved. Even then, availability will probably not exceed 20% of the UK's demand for diesel.

Hopes pinned on hydrogen

While biofuel looks increasingly as if it will be only part of an interim solution for mass transportation, the prospect of hydrogen powered cars with zero tailpipe emissions seems to be getting steadily closer. Several manufacturers are planning limited commercial production of fuel cell vehicles, starting as early as 2008. These cars will be

expensive and their practicality will initially be limited by the lack of a refuelling infrastructure. But they will act as a catalyst for the development of more models and wider fuel networks.

Huge technological, political and commercial issues still have to be overcome before hydrogen combustion or fuel cell cars can begin to replace conventional vehicles. In the US, for instance, it has been estimated that the cost of installing hydrogen pumps even at only a tenth of the country's 117,000 filling stations would be \$10-\$15 billion.

Unlike oil or natural gas, hydrogen is not suited to long distance distribution by pipeline, so plans for refuelling networks will focus on building outlets near to gas production centres. Honda is even investigating bringing the point of production right into drivers' homes. It plans domestic power plants that will fit into a home or garage. They will produce hydrogen from natural gas at night to run a fuel cell car by day. While the car is away, the power plant switches to producing electricity, which it feeds to the local grid.

The beginnings of large scale availability of hydrogen vehicles and fuel are probably at least a decade away and therefore too far in the future for inclusion in current fleet strategic planning. It is worth noting now that the model for fuelling the hydrogen fleet, when it arrives, is likely to be quite different from that of conventional fuels.

Electricity

Barring an unexpected breakthrough in battery technology, electricity is expected to remain a niche fuel. The primary difficulties with purely electric vehicles are range, safety and environmental concerns related to battery technology and materials. They need to be very light to maximise performance but this can compromise crash protection. However, developers continue to improve performance in these respects.

In urban environments, especially in low-emission zones (such as that planned for Greater London) or in specially designated low-speed areas, electric cars have more practical potential. Fleet interest in all-electric cars is therefore likely to centre on urban uses but not until the technological, fiscal and legal frameworks are in place.

Petrol, diesel and hybrids

New technologies and refinements that are now appearing in conventional petrol and diesel cars such as BMW's 1-Series and 5-Series 2008 models promise to deliver reductions of around 30% in CO₂ emissions dropping drivers up to 6 BIK bands, without it affecting performance.

For instance, combustion refinements, smart 'automatic stop-start' and lightweight materials used in the latest BMW 118d have dropped its CO₂ below 120g/km. Drivers therefore qualify for BIK of only 13% and would benefit

from the proposed exemption from the London Congestion Scheme in 2008 as well as possibly achieving over 60mpg on the combined cycle. All from a model that delivers increased power and performance compared with previous power units.

New models in the pipeline from other manufacturers promise to lower the bar on CO₂ emissions from conventional petrol and diesel-engined vehicles still further. With other manufacturers looking to reduce lifecycle emissions including production and recycle-ability.

Hybrid technology which currently primarily uses petrol is set to become more efficient with the advent of diesel hybrids such as the Peugeot 307 and Citroën C4 Hdi concepts, which deliver emissions of just 90g/km.



Volvo is reported to be developing a plug-in diesel-electric hybrid for its C30 hatchback and Toyota expects the price premium for hybrids to disappear by 2010 as production rises and component costs fall.

Conventional fuels and hybrid vehicles will continue to meet most fleets' needs for the next few years. High efficiency petrol and diesel cars will help fleets to control their carbon footprints and contain fuel costs. The increasing range and improved technology in hybrids will enable fleets to meet specific needs for very low CO₂ vehicles. With both technologies offering drivers the opportunity to reduce their personal tax liability.

Conclusion

Road transport is still 99% dependent on diesel and petrol. It will continue to be for several years. By 2010, 5% of each litre of petrol and diesel bought at the pumps will be 'bio'. However, manufacturers are stepping up investment in conventional fuels including hybrids and, ultimately, fuel cells. This suggests that they see biofuel as only an interim step in the eventual transition from dependence on fossil fuels to reliance on hydrogen.

However, the fact that diesel and petrol will remain the key fleet fuels over the next few years does not mean that vehicle policy can simply carry on as before.

As the carbon tax regime is set to carry on tightening. Fleets will need to steadily reduce their overall CO₂ emissions in order to mitigate the effects of rising taxes on fuel and road use. Since drivers are the primary agent in fleet fuel costs (especially in user-chooser fleets, through their own choice of vehicle) there are clear potential benefits to be gained by educating and encouraging them to take responsibility for the environmental impacts of their own vehicle choices, travel decisions and driving style.

The Government sponsored Safe and Fuel Efficient Driving (SAFED) programme for van drivers, for instance, claims to achieve an average saving of 16% on fuel costs from its participants, compared to their fuel consumption prior to training.

Regarding acquisition policy, the cost gradient between the whole-life cost of the most efficient vehicles on the market and the average vehicle is now much steeper than it was even two or three years ago. Managing the fleet profile towards the most efficient vehicles will therefore have a correspondingly greater impact on overall costs and profitability compared with allowing the process to move at the pace of the market as a whole.

As discussed in the preceding sections, commercial reality currently requires a cautious approach towards the emerging, alternatives to petrol and diesel. By focusing vehicle policy towards optimising lifetime efficiency in use of petrol and diesel based vehicles, fleets currently stand to achieve better control over costs over the the short to medium term than by committing to high concentration biofuels or adopting hydrogen vehicles early on, before the cost benefits of mass production come into play.

Over the coming 5 years, regulations and increasing fuel prices will continue to influence company decisions in this area, from both the buyers and sellers perspective. It will be of paramount importance to clearly understand the market drivers for change and the appropriate fleet policy reaction.