CLM Think Smarter

Alternative Fuel Vehicles
The Future of Driving

A guide for fleet decision-makers

Alternative Fuel Vehicles
The Future of Driving

To help inform and educate fleet operators and other interested parties, CLM has produced a series of AFV articles that build into a comprehensive guide to evaluating, selecting and operating these vehicles. In this issue we address driver awareness, the challenges and practicalities of introducing new drivetrains/fuels and the fleet policy decisions that need to be considered to encourage and incentivise take up.

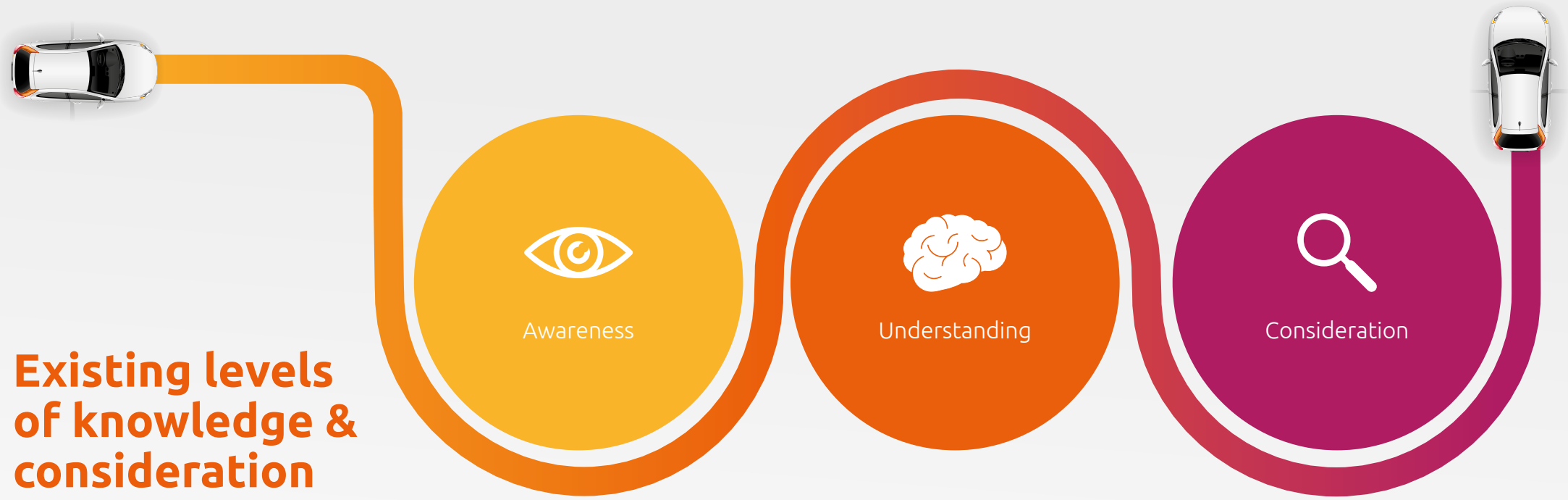
Convincing drivers of the AFV future

Anyone with fleet responsibilities will recognise that changing drivers' mindsets requires patience and well planned communication. Vehicle choice is a very personal issue and drivers will consider many factors in making their final decision.

The fact that AFVs are relatively new to our streets, and that the technology is developing at such a rapid rate, inevitably means that some drivers will be put off from making the switch. But, by providing the right information and tools, it's possible to change attitudes and ensure that drivers make an informed decision about whether an AFV is right for them.

This part of the guide looks at drivers' current attitudes towards AFVs and some of the key factors that could help to increase consideration of these vehicles:

- Existing levels of knowledge and consideration
- Fuel costs for private mileage
- Vehicle performance
- Journey range
- Vehicle charging
- Fleet policy considerations and tools



Existing levels of knowledge & consideration

In late 2017, CLM commissioned research to better understand drivers' awareness of and attitudes toward AFVs. The results demonstrated that, while drivers were aware of different types of AFV, their knowledge about them was limited. Here are some of the key points:

82% of drivers are aware of hybrid electric vehicles (HEVs)

72% are aware of plug-in hybrid electric vehicles (PHEVs)

61% are aware of battery electric vehicles (BEVs)

28% are aware of hydrogen fuel cell electric vehicles (FCEVs)

When asked to match the types of vehicle to definitions of how they operate

66% were able to match the definition for BEVs

38% for HEVs

28% for FCEVs

24% for PHEVs

Drivers also felt poorly informed about the key facts relating to running an electric vehicle:

49% felt ill-informed about the journey range of modern AFVs

53% about the availability and location of charge points

57% about company car tax rules

58% about list prices and availability of government grants

33% of drivers said that they were likely to consider an HEV as their next car

27% a PHEV

27% a BEV

Private mileage fuel costs

We covered the cost advantages that AFVs deliver to drivers in the form of reduced company car tax and the benefits to employers through reduced National Insurance payments and lower servicing costs in our previous guide – What's happening in the Alternative Fuel Vehicle space? This is available to download at **www.clm.co.uk/resources-library.** Drivers will also have a keen interest in how much a vehicle will cost them to run for the private mileage that they cover each year.

To illustrate this we've taken one of the best selling cars in the UK, the VW Golf, which happens to be available with a wide range of power units, both conventional and alternative, and provided a real-world view of the fuel costs of the different variants.

It should be noted that the fuel and power consumption figures used are not manufacturers' official figures, but come from a range of vehicle reviews aimed at assessing real-world conditions.

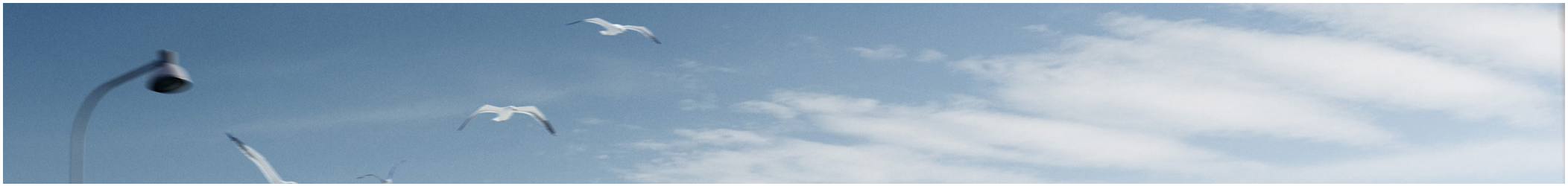
Note For the purposes of this comparison we've selected the following Golf variants which all sit at the premium end of the range (the Golf GTD is one of the top selling fleet cars in the UK)

Golf GTI
Conventional
2L Petrol Turbo

Golf GTD
Conventional
2L Diesel Turbo

Golf GTE
1.4 litre Petrol Turbo
Plug-in Hybrid (PHEV)

e-Golf
100kw Battery
Electric (BEV)



Running cost comparisons

Making definitive comparisons across the Golf variants isn't easy, particularly as the GTE and e-Golf can be driven in a number of different modes, which make a significant difference to their energy usage. However, the figures in the table do provide a reasonable idea of the comparative costs of running each variant.

Variant	Golf GTI	Golf GTD	GOLF GTE	e-Golf
Real-world fuel consumption in litres per 100km	7.4L/100km	6.06L/100km	4.04L/100km	N/A
Cost of fuel per 100km	@120p/litre £8.88	@122.5p/litre £7.42	@120p/litre £4.98	N/A
Electrical power consumption in kWh per 100km	N/A	N/A	12kWH/100km	12.7kWH/100km
Cost of electric power used	N/A	N/A	@13.5p/kWH £1.62	@13.3p/kWH £1.71
Total cost per 100km	£8.88	£7.42	£6.60	£1.71
Total cost per 10k private km	**£888**	**£742**	**£660**	**£171**

Vehicle performance

Sticking with the same range of cars, we have also compared their power outputs and performance figures. While the conventionally powered models offer the greatest outright performance, the AFV variants do offer useful acceleration, particularly given their fuel economy advantage.

While maximum speed ratings are of little relevance in real-world driving, the e-Golf's maximum of 93mph is certainly significantly lower than the other variants, if still well above the maximum speed allowed on UK roads.

Variant	Golf GTI	Golf GTD	Golf GTE	e-Golf
Maximum Power (PS)	230 @4700rpm	184@3500rpm	204@5000rpm	136@3000rpm
Maximum Torque (Nm)	350@1500rpm	380@1750rpm	350@2500rpm	290@1600rpm
Top Speed (mph)	155	144	138	93
0-62 mph time (secs)	6.4	7.4	7.6	9.6

Journey range

As we saw in our first guide, the different types of AFV can be bewildering. It's therefore, no surprise that our research found that 49% of drivers felt that they were ill-informed about the journey range of these vehicles.

Driving habits

Realistically it's going to take any driver new to AFVs some time to get over their concerns about range. But, it's surprising how well the vehicles on the market today fit with the typical habits of UK drivers.

Figures from the Office of National Statistics (ONS) reveal that the average commute distance is less than ten miles, and that one-third of drivers never travel more than 80 miles in a single trip. Based on these numbers there isn't a single battery electric vehicle (BEV) on sale in the UK that wouldn't offer viable transport for most journeys taken by the average motorist.

The fact that most cars also sit dormant during working hours and at night also provides the perfect opportunity for recharging. Assuming the ability to charge at home (and potentially also at work) the vehicle would always be ready for use and would often begin its journeys fully charged.

Extended range

Looking beyond BEVs to plug-in hybrids (PHEVs) and range-extended BEVs and practicality takes a big leap forward. While most PHEVs can only travel around 20-30 miles on battery power alone, their petrol (or in a few cases, diesel) engines give them ranges equalling or bettering those of conventional cars.

While there is only one range-extended BEV car on sale in the UK currently it is one of the top selling models. The BMW i3 Rex has an electric only range of around 140 miles but with its on-board, two cylinder generator can travel up to 287 miles between charges.

Visit **nextgreencar.com** to compare the journey range of all types of AFV.

Vehicle charging

Charge times

It's all very well having a BEV that can deal with your daily commute but if it takes too long to recharge then its practicality is cut dramatically.

Charge times are dependent on two things, the technology in the vehicle and the technology of the charge point. The vehicle will only charge at the lower of either its own charging capabilities or that of the charger. The good news is that charging technology is improving all the time and this means that charge times are falling.

The higher the kilowatt (kW) rating of the charge-point, the faster it will be able to charge any given vehicle. So-called Rapid Chargers are now a common sight at motorway and main road service areas in the UK and these tend to have a kW rating of around 50-120. Charge-points as powerful as 150 kW are already entering production and it is anticipated that chargers as fast as 350kW will be available in the foreseeable future.

	Domestic three-pin plug	Slow charger	Fast charger	Rapid charger
Kilowatt rating	2.3	3.5	7-22	50-120
Average charge time to full	12+ hours	8-10 hours	2-6 hours	20-30 minutes (to 80% charge)

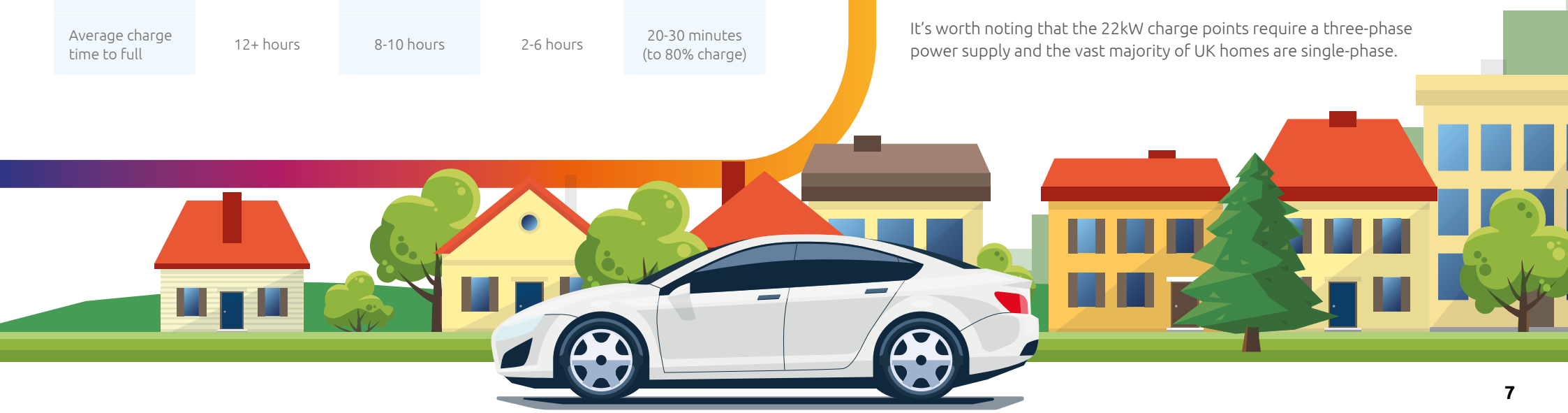
Home charging

The options for home charging are either the standard domestic three-pin plug that we all have available, or the installation of a dedicated electric vehicle charging point.

These charge points range from Slow (3.5kW) to Fast (7-22kW) and the price of installation increases with the capacity. The good news is that government (OLEV) grants are available to help with the cost. An indication of the cost of chargers of various speeds is provided below (source Pod Point):

	Before OLEV grant	Including OLEV grant
Slow charger (3.5kW)	£779	£279
Fast charger (7kW)	£859	£359
Fast charger (22kW)	£1499	£999

It's worth noting that the 22kW charge points require a three-phase power supply and the vast majority of UK homes are single-phase.

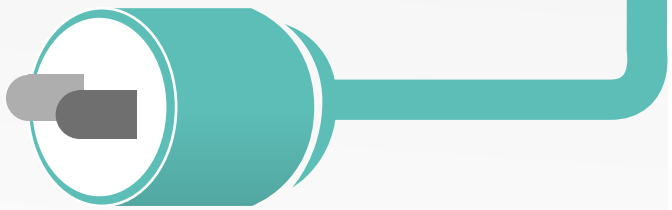


Vehicle charging

Socket types

There is also a choice of dedicated socket type. A tethered unit comes with a built-in charging cable and will only be suitable for certain types of car. Asian-built cars have what is known as a Type 1 connector and European cars have a Type 2 connector. These are not interchangeable so if the car is changed, there may also be a need to change the tethered socket.

The OLEV grant can only be claimed once per person, so a better option may be to have a Universal socket installed. These will connect to any type of electric car, but a separate cable will need to be purchased for the appropriate type of AFV.



For more information on OLEV grants for home charging visit:
www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#electric-vehicle-homecharge-scheme

AFVs and apartment living

If an AFV user lives in a block of flats, or other housing where they don't have the automatic authority to install a charge point of their own, they have some alternatives:

Communal charge point

Contact the landlord/ housing association or council and ask about the possibility of getting communal charge points installed on the property. A method of charging for individual use, through either pre-paid cards or separate metering, would need to be considered.

Personal charge point

Ask the landlord if a personal charge point can be installed at the tenant's cost. This is possible to do even if they don't live on the ground floor or on the car park side of the building, although it may require a separate electricity supply from their existing one.

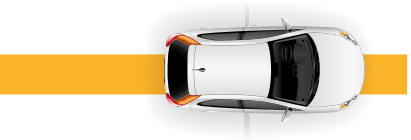
On-street public charge point

Contact the local council and ask about having an on-street public charge point installed nearby. There are grants available to local authorities for this and the following information may be useful when making the request: **https://bit.ly/2EiSA30**

Vehicle charging

Public charging

Here things do get a little complicated!
There are four main national charge point providers in the UK:



Chargemaster Polar

Pod Point

Ecotricity

Charge Your Car

Plus a range of regional providers that tend to team up with one of the national providers for access.

To gain good national coverage you do need to register with more than one of the providers. Their access and charging methods vary, with most being accessed via a smartphone app or a smartcard. Fee structures also vary with some charging a membership fee, price per connection, price per kWh used or a combination of these.

Public charge points vary in charge speed from slow through to rapid and are located at almost all motorway services, as well as many petrol stations, larger retail outlets such as supermarkets and at on-street locations mainly in urban areas.

For more information on the availability of UK public charge-points see: **www.zap-map.com**

Workplace charging

Clearly, the provision of workplace charging could act as a very significant incentive to drivers considering BEVs or PHEVs. For many drivers, even those of PHEVs with a limited electric only range, the availability of workplace charging could mean rarely using any 'fuel' for their daily commutes.

Added to this, in the 2017 Autumn Budget, the Chancellor announced that from April 2018, recharging plug-in EVs in the workplace for private car drivers will not be viewed as a Benefit-in-Kind, as it has been previously. This means businesses will be able to provide these drivers with power for their vehicles free of charge.

The size of your fleet, the vehicle types, and their usage patterns will dictate the exact charging requirements for your organisation. For example, for the cars of office based staff, who only use them for commuting, slower charging rates could be sufficient, while for frequently used vehicles rapid chargers (providing up to 80% charge in less than half an hour) could be more practical.

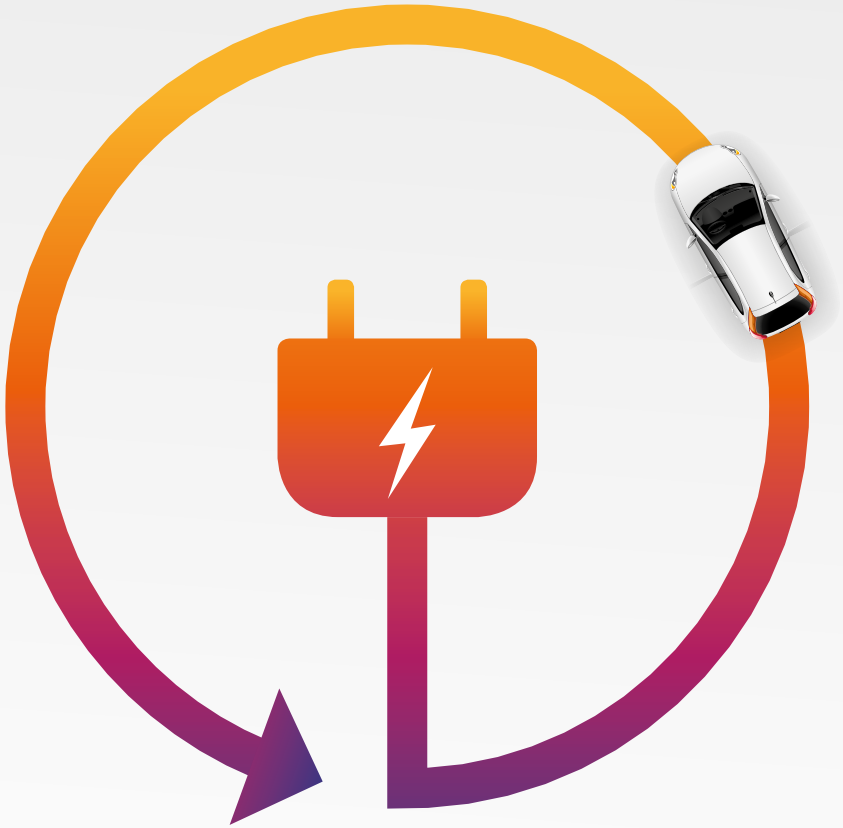
Charge point installers will advise on the number and type of outlets that will work best for you, based on the maximum electrical demand of your vehicles and the potential constraints of your site and power supply.

As mentioned in the first guide, government grants are available for the building of EV charging infrastructure in the workplace. For more information see: **www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#workplace-charging-scheme**

Fleet policy considerations

For many fleets, the attraction of AFVs - PHEVs in particular - is the potential to reduce expenditure on fuel. Many PHEVs promise exceptional MPG figures that better even the most efficient diesel vehicles. However, it's important to understand that achieving anything like the official MPG figures relies on the vehicle maximising its electric-only journey range.

Hybrid vehicles carry a lot of hardware, an internal combustion engine (ICE), an electric motor and a battery pack, along with the long list of equipment found in all modern cars. Their relatively limited battery capacity means that if they are not regularly charged, or if they are driven in an inappropriate way, that they simply become conventional ICE vehicles carrying a large amount of extra weight. This can lead to extremely poor fuel consumption and emission performance. To combat this there are a number of fleet policy tactics that are worth considering.



Availability of charging at home and at work

As already covered, providing charging points in the workplace is a must to maximise the benefits of running any plug-in vehicle as part of the fleet. It is also worth considering enforcing (and possibly incentivising) the installation of home charging facilities.

This could be as simple as requiring that plug-in drivers have off-street parking that enables them to run a cable to their car. Beyond this, ensuring that a dedicated charge point that provides faster recharging is also an option. By providing drivers with information on the government grants available for home charging points many drivers may see this as an attractive option when personal fuel use is taken into account.

Fleet policy tools

Assessment of journey profiles

For company drivers covering long distances (e.g. business need drivers), which dictates that PHEVs will cover many miles using their ICE, it could be necessary to prohibit the choice of such vehicles. Despite the recent negative coverage of diesel cars and vans, these vehicles remain the most efficient over long distances.

Similarly, multiple short journeys with no opportunity to recharge can make for inefficient use of PHEVs. For urban use, full BEVs, which have longer battery-only range, provide a good opportunity to reduce fuel costs and emissions. Operating a small pool of BEVs for short journeys, with workplace charging stations, is another alternative.

Assessment of driving styles and measurement of actual fuel efficiency

While journey type may play a large role in determining the most appropriate type of vehicle, driving style can also make a big difference to the fuel efficiency of both traditional and alternative fuel vehicles. Driver assessment and training that focuses on defensive skills has the ability to improve both safety and fuel efficiency. Both of these demand awareness and anticipation and promote a smoother driving style. Driving without heavy acceleration followed by heavy braking works particularly well for all types of vehicle.

Monitoring of actual fuel consumption will help to identify drivers that are potentially at risk as well as those driving inefficiently.

Driver incentives

While training can transfer the skills necessary to drive safely and more efficiently, changing long term behaviour often requires additional reinforcement. One way of doing this is through an incentive scheme, which rewards drivers for the desired behaviour(s). For incentive schemes to be effective there are a few basic guidelines to follow:

Realistic goals

Setting realistic goals that align with the overall objectives of the program is essential. Too easy a goal means no incentive to change and too stretching means early abandonment.

Recognition

Tangible and public recognition can be as powerful as monetary incentives. Highly visible rewards, such as the ability to upgrade a vehicle, can be very effective.

Timeline

Timelines for the incentive are important. While consistency in rewarding the desired behaviours is important, setting end dates too far in the future can act as a disincentive to change.

Competition

Competition, or 'gamification', within the incentive program can also improve results but requires regular refreshing to ensure low performers have repeated chances to compete.

Ensuring proper understanding and use of vehicle technology

The variety and complexity of technology in all modern cars can lead to confusion. For AFV drivers this can be even more of a challenge – with multiple power sources, driving modes and features such as regenerative braking to learn, it's easy to fail to get the most from the vehicle.

To assist with this it's essential that drivers familiarise themselves fully with their vehicle as soon as it's delivered. Often delivering dealers are able to provide guidance at the point of vehicle hand-over and this should be demanded by fleet decision-makers.

It's also good practice to ensure that drivers have read the key elements of the instruction manual – this in itself is a major behavioural change for many drivers! Asking drivers to confirm that they have read and understood their new vehicle instructions also provides an additional duty of care checkpoint.

Summary

AFVs have the potential to dramatically reduce not only the fuel costs for fleet operators, but also the company carbon footprint. There may be a need for a change of mindset and an adjustment in driving practices among AFV drivers, in order to get the best out of the vehicles, but there is little doubt that electric vehicles are the future of driving.

As the UK Government has announced the intention to ban the sale of new cars powered only by petrol or diesel from 2040 to combat air pollution, now is the time to begin the switch to AFVs and get ahead of the game.

About CLM

Intelligent, efficient and effective fleet management solutions

At CLM we understand your organisation's fleet management needs. We know one of your largest overheads is your fleet and managing it can be time consuming and costly.

For over 35 years we've prided ourselves on our ability to provide intelligent bespoke fleet management solutions to businesses across the UK.

Our team of specialists challenges tradition, ousts the norm and provides smart solutions at the best possible value.

- We are fleet management specialists ensuring you receive exactly what you need
- We provide a personal service
- We minimise risks and free up valuable resource
- We have a full range of services and the resources to support your organisation
- We turn the complex into the clear
- We just think smarter

CLM shares the values, heritage of competence, honour and expertise of the McMillan Shakespeare Group, all of which we use to develop and provide the most effective fleet management solutions to our client partners.

CLM Fleet Management

Corporate House,
Jenna Way,
Newport Pagnell
MK16 9QB

Find out more or talk to us about your requirements
Call us on 01908 210100

email info@clm.co.uk or visit www.clm.co.uk