



THE BUSINESS OF... **LOW EMISSION VEHICLES**

We examine the value of hybrid, plug-in hybrid and pure EVs now and in the future

WHICH POWERTRAIN IS RIGHT FOR YOUR FLEET?

Distances travelled can have a major impact on making the appropriate choice

Electrified vehicles are playing an increasing role in the operation of fleets, with their importance expected to grow further in the future. Latest figures from the Society of Motor Manufacturers and Traders (SMMT) show that in 2018, 144,089 battery electric (BEV), plug-in hybrid (PHEV), petrol-electric and diesel-electric hybrids were registered, an increase of 21% compared with the previous year. The share of the overall new car market alternative-fuelled vehicles (AFVs) account for is still small at 6%, but this is also 1.4 percentage points higher than in 2017, highlighting the growing role the technologies are playing. Here we look at how the powertrains work and how they are being used by fleets.

HYBRID

Hybrid powertrains offer the simplest way of adding electrified vehicles to fleets. They use a combination of either a petrol or diesel engine plus an electric motor. The details of this arrangement will vary from car to car, but they will almost always be able to charge their battery through the internal combustion engine (ICE), without the need to plug the car into a charging socket. One of their main attractions is that they offer the potential to match the fuel economy of diesels over long distances while reducing emissions of nitrogen oxide, particulate matter and CO₂. This flexibility means they can be used as a direct replacement for diesel models – Slimming World last year took delivery of its 100th Lexus hybrid, each covering 16,000 business miles a

“PHEV TECHNOLOGY IS BRILLIANT BECAUSE YOU HAVEN'T GOT THAT RANGE ANXIETY YOU MAY HAVE WITH A PURE EV”

year, after choosing to replace diesel models with hybrids. Organisations and drivers can also make savings by opting for the technology ahead of diesels. For example, Ford's Mondeo is available with a 2.0TiVCT 187PS hybrid powertrain with similar power to a 2.0 TDCi 180PS diesel model. In Titanium trim levels, the hybrid's P11D price is £1,220 higher at £26,695, but its lower CO₂ (108g/km vs 132g/km) and the fact it is not subject to the 4% benefit-in-kind (BIK) tax diesel supplement means that both the employee's BIK and the employer's Class 1A national insurance contribution are lower. In the 2019/2020 tax year, this means a 20% taxpayer would pay £1,335 in BIK tax for the hybrid – £397 less than they would for the diesel alternative. An organisation's Class 1A NIC would be £810 for the hybrid and £1,090 for the diesel. Total Security Services (TSS) is replacing the diesel models in its fleet with 70 Toyota C-HR

hybrid crossovers, which will be used by its field-based area management team. “We were very impressed that the emissions are 87g/km of CO₂, a figure which ensures a lower BIK tax rate for our people,” says Jamie Caplin, financial director of TSS. Figures from KeeResources also show that a fleet can make fuel savings by opting for hybrids over diesels. Over a four-year/80,000-mile cycle, the Mondeo hybrid has a fuel cost of 9.68 pence per mile (ppm). The diesel would cost 11.03ppm. However, the diesel will be 0.2ppm cheaper to run at 39.35ppm.

PLUG-IN HYBRID ELECTRIC VEHICLES

Like hybrids, PHEVs also use a petrol or diesel engine combined with an electric motor to propel the car. The key difference is that a PHEV's battery is much larger, can be charged directly from the national grid and allows the vehicle to have a zero emission range, typically 20-40 miles. After the battery range has been utilised, the hybrid capability means the vehicle can continue journeys powered by its ICE. However, while this technology gives them low CO₂ emissions – putting them in a low BIK tax band – and high fuel economy during the official test procedures, once the battery is empty the car's fuel economy can be as low as 30-35mpg, meaning PHEVs will not be suitable for all drivers. “PHEV technology is brilliant because you haven't got that range anxiety you may have with a pure electric vehicle,” says Jason Plummer, senior manager, general affairs department at Panasonic Business Support Europe, which operates 31 PHEVs – around 20% of its fleet. “Our PHEV drivers are typically people who don't do a huge amount of business miles, so if someone is doing more than 80 miles a day then they would probably do better using a diesel vehicle where they get a return of 60mpg or something like that.”

Panasonic has charge points at its office and employees must be able to install a point at home if they are to have a PHEV as a company car. The organisation also operates a dedicated email group among PHEV drivers to ensure they can co-ordinate charging to maximise the number of people able to charge in a day. Plummer expects many PHEV drivers to opt for BEVs when their cars come up for renewal. This is due to the increasing capability of BEVs, as well as the changing tax landscape. The BIK tax band for vehicles with CO₂ emissions of 0-50g/km – which plug-in hybrids tend to fall into – will be 16% in 2019/20, before falling in 2020/21 to between 2% and 14%, dependent on the electric range of the vehicle. Plummer, who drives a Mitsubishi Outlander PHEV which averages 340mpg, feels this may



Mitsubishi Outlander PHEV averages 340mpg for Panasonic's Plummer



Ford Mondeo's hybrid has power similar to its diesel model



Hyundai Kona now has a range close to 300 miles

help spark a “significant move” among PHEV drivers to BEVs. “I think that when it comes to changing cars, a lot of the people we've got in PHEVs will look to pure electric,” he adds.

BATTERY ELECTRIC VEHICLES

BEVs are powered solely by a battery and as they rely entirely on electricity for fuel, they do not produce any tailpipe emissions, putting them in the lowest BIK tax band. Fuel costs and service, maintenance and repair (SMR) costs are also low as they use far fewer moving parts compared with an ICE vehicle. BEVs also qualify for the Government's plug-in car grant, which is equivalent to £3,500 towards the car's purchase price. Advances in technology are also overcoming many of the traditional obstacles to BEV adoption. For example, ‘mainstream’ models such as the Hyundai Kona Electric and Kia e-Niro offer ranges of almost 300 miles. This means limited range is often no longer an issue, while the arrival of high-powered charge points reduces the time needed to charge. These advances have seen many major organisations such as Royal Mail and ScottishPower begin to adopt the technology. “As a company, we are 100% behind electric vehicles and we want to transition as much of our fleet as possible,” says Gemma Rankine, general services director at ScottishPower. “For every vehicle we identify for replacement, we have to look at the telematics data, work with our business and understand what vehicles would be suitable to be replaced by a BEV.” The company carried out a six-month trial of six Nissan e-NV200 and four Peugeot Partner Electric small vans to establish how BEVs could fit into its fleet of the future. The electric vans were allocated to drivers who typically travelled less than 60 miles in a day. They were also returned to depots overnight where they were charged. The drivers still had access to their diesel vehicles for times when they needed to make longer journeys, but fleet manager John Moore says they were asked to use the electric vehicles as much as possible. “The upshot was that we were running the electric vehicles considerably and we had trouble getting them back from some drivers which showed we had great buy-in,” he adds. Following the trial, the company ordered five e-NV200s. It is also ordering 10 electric cars to go into its 56-strong pool fleet. Rankine says Scottish Power will also be looking at how it can introduce EVs on to its essential-user fleet – employees who typically run small hatchbacks and have company vehicles due to the mileage they do in their role.

HYBRID VS PLUG-IN HYBRID VS BATTERY ELECTRIC VEHICLES – COST COMPARISON

Hyundai Ioniq Premium SE			
Engine variant	1.6h-GDi hybrid	1.6h-GDi plug-in hybrid	Electric
P11D value	£25,240	£30,140	£31,990
CO ₂ (g/km)	84	26	0
Fuel economy (mpg)	83.1	256.8	n/a
Electric range (miles)	n/a	31	174
BIK band (2019/20)	22%	16%	16%
BIK (20% taxpayer)	£1,111	£964	£1,023
VED	£95 then £130	£0 then £130	£0
Class 1A NIC	£662	£541	£574
Running cost (ppm)	31.79	37.28	36.97
Fuel cost (ppm)	7.26	7.49	3.02
RV	£8,025/32%	£9,000/30%	£6,450/20%

Source: KeeResources, operating cycle four years/80,000 miles

PUBLIC CHARGING MAKES SIGNIFICANT ADVANCES

From a little more than 4,000 sites in 2016, locations have soared to 6,672 a few years later

When Nissan predicted in 2016 that the number of electric vehicle (EV) public charging locations would overtake petrol stations by August 2020, it may have seemed a little fanciful.

At the time there were 8,472 filling stations in the UK – less than one-third compared with the 1970s – and public EV charge points could be found at 4,100 sites.

However, it now looks likely that the maker's prediction may have been too conservative.

Latest figures from the UK Petroleum Industry Association show that at the end of 2017, there were 8,422 filling stations in the UK but, according to Zap-Map, which monitors the UK's charging infrastructure, the number of EV charge point locations has soared to 6,672 (11,087 charge points).

This is set to explode even further next year as charge point providers continue to expand their networks, including big players such as Pod Point and BP Chargemaster, which have already

announced major plans to install units at hundreds of new locations.

In November, Pod Point announced that, as part of a new partnership between Tesco and Volkswagen, it will install 2,400 new chargers at 600 selected Tesco Extra and Superstore car parks.

This includes both 7kW fast chargers and up to 100 50kW rapid chargers. Pod Point says the 7kW chargers will be free to use, while the 50kW units will be "priced in line with market rates".

ULTRA-FAST CHARGE POINTS ROLL-OUT

Following oil giant BP's £130 million acquisition of Chargemaster, the operator of the UK's largest EV charging network, BP Chargemaster will begin to roll-out ultra-fast 150kW charge points, capable of delivering 100 miles of range in 10 minutes, across its network of almost 1,300 service stations from the beginning of this year.

Other major investments in the charging network will see existing charge points upgraded to newer, more reliable units.

Ecotricity, which operates the Electric Highway

network, has started to replace 30 first-generation charge points. Dale Vince, founder of Ecotricity, says these accounted for 10% of the network but 80-90% of its reliability problems.

He adds: "We are also planning HPC (high-powered charging) for 2019 – the first wave of 20 sites are being scoped out now. HPC is the new state-of-the-art in fast charging, running at up to 350kW.

"The cars won't be on the road next year that can use that, though we should see some that can use up to 150kW. But 350kW is coming, in pumps and cars – giving an estimated 100-mile top-up in around five minutes.

A number of years ago, one issue with recharging EVs at public charge points was the variety of socket systems used by vehicles: there were three main types of connector: J1772, Type 2 Mennekes and CCS (combined charging system).

A driver was often reliant on the plug compatible with their car being available, or using a converter cable to connect to a different type of socket.

But in 2014, the European Union agreed that the

Type 2 Mennekes socket would become the standard throughout Europe.

While this has simplified vehicle recharging for newer EVs, popular older models such as the Nissan Leaf and the Mitsubishi Outlander PHEV use older socket types to recharge. The CCS socket offers faster charging, where available, but is compatible with Type 2 Mennekes.

HOW TO PAY

A more relevant current issue is how a driver can pay for the charge given the vast number of charge point operators.

"[It] can be baffling," says Edmund King, president of The AA. "Many charging networks require their own apps or RFID cards which are necessary to start a charge.

"Some of these require a subscription; others require pre-loading with funds while some make a separate 'connection charge' as well as payment for the energy purchased.

"A few charging networks accept a contactless debit or credit card as well as a network RFID

card and, surely, this is by far the simplest method.

"There is nothing more frustrating than arriving at a charger for which you don't have the appropriate app and then spending time finding, installing, registering and perhaps loading with funds before you can plug-in and charge – assuming your smartphone is, itself, charged and has a signal.

"Meanwhile, the operator has retained your deposit and you may never use that charging network again."

There is currently no legislation in the UK that requires roaming – one operator's membership system working at a different network's sites – but all newly-installed charge points must have ad-hoc access, meaning that someone can arrive at a charge point (with no prior membership requirements) and use it there and then. This can be in the form of downloading an app or with a contactless card.

While this may not be an ideal solution, it does at least mean drivers will be able to charge their vehicles.

LOCATING PUBLIC CHARGE POINTS

Fleets and drivers have a number of ways to locate convenient public electric vehicle charge points.

There is a tool on the Fleet News website (fleetnews.co.uk/charging-point), individual charging networks such as Pod Point and Polar have made the locations of their charge points easily searchable through their own apps, while Zap-Map includes information from a wide range of suppliers.

Also Google Maps now show nearby chargers when a user searches for related terms like 'EV charging' or 'charging stations'.

Google Maps will also include information about what types of ports are available at a given location, how powerful they are and pricing, as well as driver reviews and ratings.

SPONSOR'S COMMENT

By Marc Samuel, fleet sales operations manager, Honda UK



Fleet operators have fully embraced the transition to low emission vehicles in recent years, meaning there are more hybrids and pure EVs on the roads than ever

before. For fleet operators, the real opportunity is understanding the journeys your drivers undertake to ensure the most appropriate vehicle and fuel fit.

It pays to be aware of what low emission vehicles are available, their features and benefits (including tax incentives) and, importantly, their fit for the future. If your team members rack up a lot of motorway miles, for example, they probably won't realise the benefits a hybrid could deliver without proper training and support.

It's the same for regular countryside journeys and having a pure EV.

So, understanding and embracing a future-proof solution is important.

In many cases, manufacturers are best placed to advise which models would benefit your fleet.

"While a number of people are still anxious about the range of their hybrid or EV, there are many more charging points already active in the UK than we're led to believe by mainstream media. Therefore, education is important for fleet operators to understand how to access them and ensure their drivers can too.

When it comes to workplace charging, there are various incentives and funding available. Even if you're not looking to embrace a hybrid or electric fleet just yet, you need to be thinking about the infrastructure requirements for your building or car park now and getting ahead of the game so you'll be prepared for the future.

For more information on Honda's corporate services, visit www.honda.co.uk/cars/new/corporate-services.html



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Fuel consumption figures for the 18YM Civic 5 door Diesel range in mpg (l/100km): Combined 53.3 (5.3) - 62.8 (4.5). CO₂ emissions**: 109 - 93g/km. Figures shown are for comparability purposes only and you should only compare fuel consumption and CO₂ figures with other cars tested to the same technical procedures. These figures may not reflect real life driving results, which will depend upon a number of factors including accessories fitted (post-registration), variations in weather, driving styles and vehicle load.

Important information: *Contract Hire available to Business Users only, subject to status. Information correct at January 2019. Vehicles must be ordered between 1st January 2019 and 31st March 2019 with registration and delivery by 30th June 2019. Rentals exclude optional maintenance. Excess mileage and other charges may apply dependent on the mileage and return condition of the vehicle at the end of the contract. Contract Hire is provided by Arval UK Limited trading as Honda Contract Hire, Whitehill House, Windmill Hill, Swindon, SN5 6PE. For further information please contact honda.co.uk/civicfleet. **There is a new test for fuel consumption and CO₂ figures (WLTP). Figures shown however are based on the outgoing test cycle and will be used to calculate vehicle tax on first registration. You can find out more about the changes brought in by WLTP at <http://wltpfacts.eu/>

WORKPLACE CHARGING MEANS GETTING THE NUMBERS RIGHT

Key questions fleets need to answer to strike a balance between wants and needs

Installing the right workplace charging infrastructure can help an organisation get the most out of its electric vehicles (EVs).

Get it right and the vehicles will be available when needed with sufficient charge to carry out their duties, helping cut emissions and reduce fuel costs.

However, get it wrong and the organisation can be left with vehicles without enough range, causing disruption and unnecessary downtime, or with too many expensive chargers which sit unused.

"There is often a difference between what a customer wants and what they actually need, so we need to try and strike a balance," says Giles Benbow, senior contracts engineer at Actemium EV, which, as part of Vinci Energies, specialises in EV infrastructure.

"A lot of early adopters are very enthusiastic and there will be visions of one charging station for every EV right across the car park, and sometimes it's possible and that may be the most flexible solution but, in the majority of cases, the electrical infrastructure won't support that, so we have to be a bit clever about it."

An organisation considering installing charge points needs to determine the following:

- The number and type of EVs it is operating and how many it expects to have in the future;
- How often they will be used during a day;
- How many miles they will travel; and
- How long they will be parked for between journeys.

For example, plug-in hybrids have much smaller batteries than pure EVs, so take a much shorter length of time to charge which means 7kW charge points may suffice.

The shorter charge times could also mean more EVs could use the charge point. So, theoretically, fewer units would be needed.

However, 22kW or even 50kW rapid chargers which can charge most current battery electric vehicles (BEVs) from 0-80% in between 30 and 40 minutes may suit some organisations which run a continuously active fleet with few pauses for recharging.

A common concern among organisations is that their site's electric infrastructure would not be able to cope if too many charge points were installed, which may mean it has to install a new sub-station at great expense.

However, this is a rare situation and can almost always be solved through the use of smart chargers which manage the power delivered to each charge point, says Benbow.

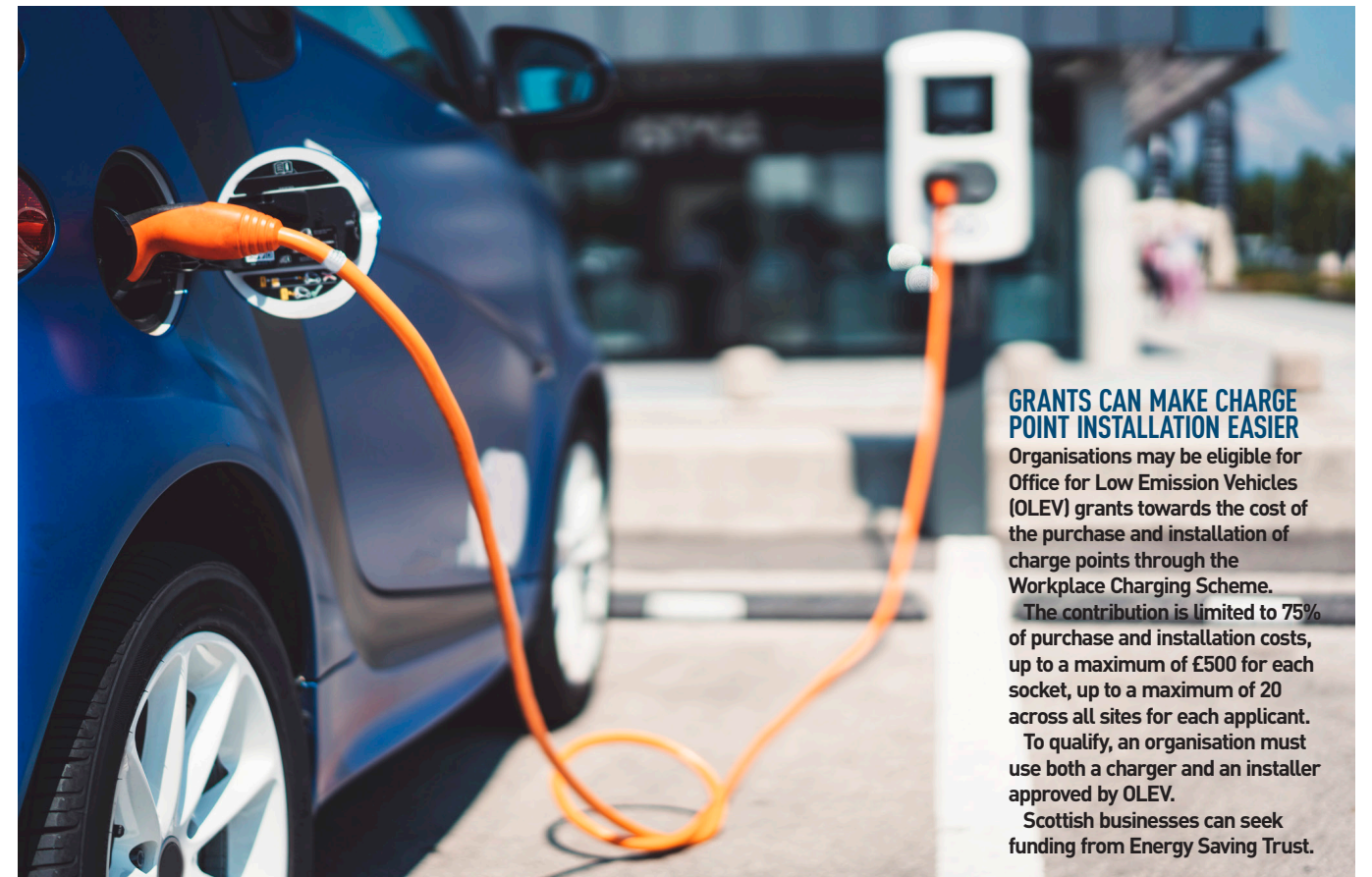
"With dynamic power management we work with whatever supply capacity we have," he says.

"Where we have major concerns about supply capacity, we analyse at least 12 months' data through the utility meter, and we install a system which ensures we can't exceed the supply capacity but distributes the available power dynamically between the charging stations.

"This means we can install many more charging points than, on the face of it, you have power to supply, and it is a completely safe system which prevents overloading."

Fleets can also introduce measures to ensure use of the charge points is optimised by increasing the number of EVs using them by not having vehicles being plugged in after they have charged.

Actemium, for example, can supply a group charge app which allows drivers to manage bookings, while some fleets have also introduced their own systems: for example, Panasonic, has a dedicated email group (see page 2), while Galliford Try operates an online booking system.



GRANTS CAN MAKE CHARGE POINT INSTALLATION EASIER

Organisations may be eligible for Office for Low Emission Vehicles (OLEV) grants towards the cost of the purchase and installation of charge points through the Workplace Charging Scheme.

The contribution is limited to 75% of purchase and installation costs, up to a maximum of £500 for each socket, up to a maximum of 20 across all sites for each applicant.

To qualify, an organisation must use both a charger and an installer approved by OLEV.

Scottish businesses can seek funding from Energy Saving Trust.

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