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Alphabet Guide to Alternative Fuels

Confused by what alternative fuels are available? Our comprehensive Guide explains all



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Introduction

The drive to increase the take-up of alternatively fuelled cars has helped expand the market dramatically in recent years, and there are now many available with different systems. These include 100% battery-electric vehicles (BEV), plug-in hybrids (PHEV), traditional

hybrids and, to a lesser extent, hydrogen fuel cell cars. Each has its own advantages and disadvantages, with all classed as ultra-low emission vehicles. Government incentives have aligned with the requirement for lower carbon emissions, and there are grant schemes available

to assist the acquisition of new electric vehicles. Choosing wisely for your business can offer significant savings and also enable a more efficient fleet. This Alphabet Guide to Alternative Fuels explains what technologies are available, how they work and the benefits they bring.

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Government Grants and Incentives

Government Plug-in Grant

The Plug-in Grant is available only to Government-approved cars with zero CO₂ tailpipe emissions when driving, and that cost £35,000* or less. The grant is set at a maximum of £2,500 per car.

Grants are also available for motorcycles, mopeds, vans, taxis and large vans and trucks (see panel, right). [CLICK HERE](#) for more information and details of Government-approved vehicles that are eligible for the grants. The grants are administered by the Office for Zero Emission Vehicles (OZEV), and the process of application is managed by the vehicle manufacturer and its retailer network rather than the purchaser.

*For private, business, fleet or demonstration models the purchase price of the vehicle is the price paid by the customer, excluding discount, not the recommended retail price. Purchase price includes: number plates, vehicle excise duty, VAT and excludes any optional extras, delivery charges and first registration fee

→ **Cars** – Government-approved cars priced below £35,000* and with zero CO₂ tailpipe emissions when driving are eligible for a maximum grant of £2,500 per car.

→ **Taxis** – taxis with CO₂ tailpipe emissions of 50g/km or less and an all-electric range of at least 70 miles are eligible for a maximum grant of £7,500.

→ **Motorcycles** – motorcycles with zero CO₂ tailpipe emissions and a range of at least 31 miles between charges are eligible for a maximum grant of £1,500.

Electric Vehicle Homecharge Scheme (EVHS)

The EVHS provides grant funding of up to 75% of the cost of installing an electric vehicle chargepoint at a domestic property across the UK, capped at £350 including VAT.

The Grant covers one OZEV-approved homecharge unit per eligible electric or plug-in vehicle, and up to two eligible vehicles per household. The unit must be installed by an OLEV-approved chargepoint installer and you must be named as the primary user of the vehicle.

To qualify for the EVHS grant you must have off-street parking, such as a driveway or garage, or have an eligible vehicle on order from 01 October 2016 onwards.

For further information on the Electric Vehicle Homecharge Scheme can be accessed [CLICK HERE](#). To find out if your vehicle qualifies for the EVHS grant, [CLICK HERE](#).

→ **Mopeds** – mopeds or scooters with zero CO₂ tailpipe emissions and a range of at least 19 miles between charges are eligible for a maximum grant of £1,500.

→ **Vans** – N1 vans under 2.5 tonnes GVW with CO₂ tailpipe emissions of 50g/km or less and an all-electric range of at least 60 miles are eligible for a maximum grant of £3,000.

→ **Large vans and trucks** – vehicles with a zero CO₂ tailpipe emissions range of at least 60 miles benefit from a maximum grant of £16,000 (N2: 3.5t–12.0t GVW) or £25,000 (N3: 12.0t+ GVW).

You can find out more about low-emission vehicles on the Office for Zero Emissions website. [CLICK HERE](#)

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Benefit-In-Kind Tax

The benefit-in-kind (BIK) tax system for company cars clearly incentivises the selection of zero or low tailpipe emission cars with a high battery range (see table, right, for a summary of low emission tax bands). The appropriate percentages for BIK tax depend on the car's CO₂ emissions and its all-electric zero emission range.

For cars with zero CO₂ tailpipe emissions when driving – as well as new cars with CO₂ tailpipe emissions of 1-50g/km and a minimum all-electric range of 130 miles – the BIK tax rate is set at 1% in 2021/22, rising to 2% in 2022/23, at which level the rates remain frozen until 2024/25.

Phase-out of new petrol and diesel car sales in 2030

The Government has set the phase-out date for new petrol and diesel cars for 2030, with all new cars and vans to be fully zero-emission when driving by 2035. The move is underpinned by a commitment of over £1.8 billion to support greater uptake of zero tailpipe emission vehicles for greener car journeys.

Between 2030 and 2035, new petrol and diesel cars and vans can be sold only if they have the capability to drive a significant distance with zero tailpipe emissions, for example plug-in hybrids, with the exact models to be defined at date of publication.

BIK tax bands for new zero and low CO₂-emitting cars

CO ₂ tailpipe emissions (g/km)	All-electric range (miles)	BIK tax 2021/22 (%)	BIK tax 2022/23* (%)
0	All	1	2
1-50	Over 130	1	2
1-50	70-129	4	5
1-50	40-69	7	8
1-50	30-39	11	12
1-50	Less than 30	13	14

* Rates frozen at this level until 2024/25

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Practical Considerations

Click [HERE](#) for more on Practical Considerations

Fuel duty

Fuel duty is paid on each litre of road fuel purchased (or per kilogram in the case of gases). Therefore the fuel efficiency of a vehicle, the way a vehicle is driven and the distance driven will determine the total amount of duty paid. Electricity is not subject to fuel duty, so battery electric vehicles (BEV) are duty-exempt.

Government Advisory Fuel Reimbursement Rates (AFR)

AFR fuel reimbursement rates for company cars apply to petrol and diesel hybrids. The HMRC AFR equivalent rate – the Advisory Electric Rate or AER – for pure electric vehicles is set at 4p/mile. [CLICK HERE](#) for further information.

Fuel Benefit Charge (FBC)

As electricity is not considered a fuel, there is currently no fuel benefit charge for battery electric vehicles (BEV). This means that if an employer allows an employee to top up the battery of their BEV, this does not constitute a fuel benefit and no tax is payable. However, the FBC can apply to plug-in hybrid electric vehicles (PHEV) or electric range-extended electric vehicles (EREV) at work.

Enhanced capital allowances (ECA)

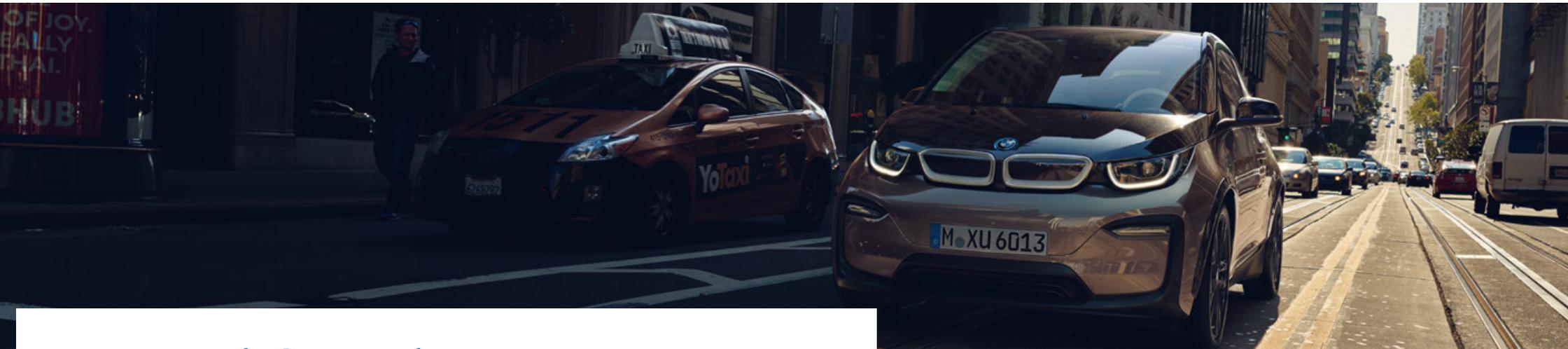
Eligibility for enhanced capital allowances (ECA) for cars is based on CO₂ emissions. If a car has zero emissions of CO₂ while driving, it qualifies for a 100% first-year capital allowance (FYA) in 2021/22,

but the vehicle must be a new registration. Cars with CO₂ emissions of 1-50g/km qualify for an 18% allowance while those with CO₂ emissions exceeding 50g/km qualify for a 6% allowance. Leased cars are not eligible for the 100% FYA.

130% capital allowance 'super deduction'

A 130% first-year allowance, effective from 01 April 2021 to 31 March 2023, applies to expenditure on new main pool items, such as vans and electric vehicle charging equipment, but excluding company cars. The 'super deduction' will allow companies to cut their tax bill by up to 25p for every £1 invested. Businesses can also take advantage of a 50% first-year allowance for qualifying special rate expenditure.

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Practical Considerations (CONTINUED)

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Vehicle Excise Duty (VED)

VED exemption in 2021/22 applies only to cars with zero CO₂ tailpipe emissions costing £40,000 or less, with an exception made for cars over £40,000 with zero CO₂ emissions. Cars costing over £40,000 (except those with zero CO₂ emissions) attract an additional £335 a year for five years from the second year. For details of 2021/22 VED rates, see the table (right).

VAT

Vehicles are subject to standard levels of VAT (20%) regardless of their emissions of CO₂, but electricity has varying treatment. Electricity that is supplied for domestic, non-business and charity use attracts 5% VAT, while electricity that is supplied for business use is subject to VAT at 20%.

Petrol, diesel and hydrogen are considered to be road fuels and therefore also attract the standard level of 20% VAT while electricity that is used to recharge a wholly battery-electric vehicle (BEV) or plug-in hybrid vehicle (PHEV) at home attracts VAT at 5%. Electricity for low-emission vehicles that are recharged at work attract 20% VAT and hydrogen used to refuel fuel cell electric vehicles (FCEV) also attracts VAT at 20%.

VED rates 2020/21

VED Band	CO ₂ emissions (g/km)	First year rate (£)	First year rate (diesels) (£)*	Standard rate Yr2 on (under £40,000) (£)	Standard rate Yr2 on (over £40,000) (£)**
A	0	0	0	0	0
B	1-50	10	25	155	490
C	51-75	25	115	155	490
D	76-90	115	140	155	490
E	91-100	140	160	155	490
F	101-110	160	180	155	490
G	111-130	180	220	155	490
H	131-150	220	555	155	490
I	151-170	555	895	155	490
J	171-190	895	1,345	155	490
K	191-225	1,345	1,910	155	490
L	226-255	1,910	2,245	155	490
M	Over 255	2,245	2,245	155	490

* Applies to diesel vehicles that do not meet the Real Driving Emissions Step 2 (RDE2) standard. Alternative fuel vehicles, including hybrids, bio-ethanol and LPG, pay £150 a year. ** Cars with a list price over £40,000, except those with zero CO₂ tailpipe emissions, pay an additional rate of £335 on top of the standard for five years following the first year rate, after which the rate reverts to the standard rate. 2021/22 rates apply from 01 April 2021

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Alternative Fuel Comparisons

DRIVELINE	PLUG-IN HYBRID ELECTRIC VEHICLE (PHEV) Eg BMW 530e (Parallel Hybrid), Škoda Octavia Plug-in Hybrid	BATTERY ELECTRIC VEHICLE (BEV) Eg BMW i3, Nissan Leaf
DESCRIPTION	A petrol or diesel engine works with a battery powered electric motor. Both power units can be used together or individually, and the combustion engine can charge the battery.	A car which carries a battery pack to power an electric motor that drives the wheels. It is charged by plugging into an electricity supply.
GOVERNMENT PLUG-IN GRANT ELIGIBILITY	No. Only cars with zero CO ₂ emissions, with certain exemptions, qualify for the maximum grant of £2,500, with certain exemptions subject to Government approval and a price cap of £35,000*. CLICK HERE for a list of eligible vehicles. Click the Government grants and incentives tab above for details.	Yes. BEVs are classified with zero emissions of CO ₂ and so qualify for the maximum grant of £2,500, subject to Government approval and a price cap of £35,000*. CLICK HERE for a list of eligible vehicles. Click the Government grants and incentives tab above for details.
BIK TAX AND VED IMPLICATIONS	The benefit-in-kind (BIK) tax system for company cars clearly incentivises the selection of zero or low tailpipe emission cars with a high battery range. PHEVs benefit from reduced BIK tax dependent on their CO ₂ emissions and all-electric range. VED applies according to emissions. Click the BIK tax tab above for details. In 2021/22, for Government-approved cars with CO ₂ emissions of 1-50g/km, the distance they can cover with zero tailpipe emissions affects BIK tax liabilities.	The benefit-in-kind (BIK) tax system for company cars clearly incentivises the selection of zero or low tailpipe emission cars with a high battery range. In 2021/22, drivers of Government-approved BEVs are subject to BIK tax at 1% regardless of registration date, rising to 2% in 2022/23. These rates are then frozen until 2024/25. Click the BIK tax tab above for details. As BEVs are classified with zero CO ₂ emissions, they are exempt from VED in 2021/22.
LONDON CONGESTION CHARGE ELIGIBILITY	Currently, only vehicles that meet Euro VI standards (petrol and diesel), emit no more than 75g/km of CO ₂ and have a minimum 20-mile zero-emission range qualify for the 100% cleaner vehicle discount. From 25 October 2021, the cleaner vehicle discount will change so that only battery electric or hydrogen fuel cell vehicles with zero emissions of CO ₂ are eligible. From 25 December 2025, the cleaner vehicle discount will be discontinued. From this date, all vehicle owners, unless in receipt of another discount or exemption, will need to pay to enter the Congestion Charge zone during chargeable hours. Taxis and Private Hire Vehicles are exempt from the charge if actively licensed with London Taxi and Private Hire (TPH). To find out if your car qualifies for exemption or a discount, CLICK HERE .	Government-approved BEVs are classified with zero emissions of CO ₂ and so qualify for Transport for London's 100% cleaner vehicle discount. From 25 October 2021, the cleaner vehicle discount will change so that only battery electric or hydrogen fuel cell vehicles with zero emissions of CO ₂ are eligible. From 25 December 2025, the cleaner vehicle discount will be discontinued. From this date, all vehicle owners, unless in receipt of another discount or exemption, will need to pay to enter the Congestion Charge zone during chargeable hours.
REFUELLING	Recharging or conventional refuelling – the combustion engine drives the car and also charges the battery.	Recharging only.
FUELLING AVAILABILITY	Widespread, as PHEVs can top up with fuel or recharge using a domestic supply or the charging network.	There are more than 35,000 UK public charging connectors in over 12,000 locations, of which some 9,000 are rapid charging connectors (Source: zap-map.com). Tax advantages apply to new and existing cars.
ADVANTAGES	Capable of electric running for longer than a traditional hybrid. Significant BIK tax advantages available and eligible for reduced rates of VED. Drivetrain eliminates 'range anxiety', while the combustion engine and electric motors together offer increased power.	Exempt from VED in 2021/22, and with BIK liability at just 1% in 2021/22 and 2% in 2022/23, frozen at this level until 2024/25. Near silent running and smooth acceleration. Much-improved battery life and fast-charging capability gives greater range at low cost. Electricity is less expensive than petrol or diesel and generates zero tailpipe emissions.
DISADVANTAGES	Not eligible for the Government Plug-in Car Grant and purchase prices tend to be relatively high as a result. Fuel cost savings may take longer to realise than with a battery electric vehicle (BEV).	Longer journeys may require planning with access to rapid charging en route but, although availability is sometimes infrequent, the chargepoint network is rapidly improving, especially in urban areas.
SUMMARY	PHEVs are seeing increasing popularity with the BIK tax rule changes in April 2020. Established choice for fleet operators and drivers. Much improved battery technology gives more zero emission all-electric mileage, with better performance available from the blend of plug-in charge and conventional fuel.	Range restrictions are less of an issue with the latest BEVs, and they are exempt from VED in 2021/22 with only small BIK % increases planned. Low running costs and exemption from congestion charging, ULEZ and low emission zones. Strong performance and quiet running are other advantages.

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Alternative Fuel Comparisons (CONTINUED)

DRIVELINE	ELECTRIC RANGE-EXTENDED VEHICLE (EREV) (Series Hybrid) Eg BMW i3 with Range Extender	FUEL CELL ELECTRIC VEHICLE (FCEV) Eg Toyota Mirai
DESCRIPTION	A vehicle driven by an electric motor, but also fitted with a small internal combustion engine which recharges the battery but does not drive the wheels. Currently, however, no EREVs are in production.	A vehicle fuelled by hydrogen and oxygen in a fuel cell stack which generates electricity to drive the car using an electric motor.
GOVERNMENT PLUG-IN GRANT ELIGIBILITY	Yes, but as no EREVs are currently in production the grant currently is of no consequence. Used vehicle purchases only, but EREVs are classified with zero CO ₂ emissions with the associated benefits.	Yes. With water vapour the only exhaust emission, FCEVs are classified with zero CO ₂ emissions and so qualify for the maximum grant of £2,500, subject to a price cap of £35,000* and Government approval. CLICK HERE for a list of eligible vehicles. Click the Government grants and incentives tab above for details.
BIK TAX AND VED IMPLICATIONS	The benefit-in-kind (BIK) tax system for company cars clearly incentivises the selection of zero or low tailpipe emission cars with a high battery range. In 2021/22, drivers of Government-approved EREVs are subject to BIK tax at 1% regardless of registration date, rising to 2% in 2022/23. These rates are then frozen until 2024/25. Click the BIK tax tab above for details. As BEVs are classified with zero CO ₂ emissions, they are exempt from VED in 2021/22.	The benefit-in-kind (BIK) tax system for company cars clearly incentivises the selection of zero or low tailpipe emission cars with a high battery range. In 2021/22, drivers of Government-approved FCEVs are subject to BIK tax at 1% regardless of registration date, rising to 2% in 2022/23. These rates are then frozen until 2024/25. Click the BIK tax tab above for details. As FCEVs are classified with zero CO ₂ emissions, they are exempt from VED in 2021/22.
LONDON CONGESTION CHARGE ELIGIBILITY	EREVs are classified with zero CO ₂ emissions and so qualify for Transport for London's 100% cleaner vehicle discount. From 25 October 2021, the cleaner vehicle discount will change so that only battery electric or hydrogen fuel cell vehicles with zero emissions of CO ₂ are eligible. From 25 December 2025, the cleaner vehicle discount will be discontinued. From this date, all vehicle owners, unless in receipt of another discount or exemption, will need to pay to enter the Congestion Charge zone during chargeable hours.	FCEVs are classified with zero CO ₂ emissions and so qualify for Transport for London's 100% cleaner vehicle discount. From 25 October 2021, the cleaner vehicle discount will change so that only battery electric or hydrogen fuel cell vehicles with zero emissions of CO ₂ are eligible. From 25 December 2025, the cleaner vehicle discount will be discontinued. From this date, all vehicle owners, unless in receipt of another discount or exemption, will need to pay to enter the Congestion Charge zone during chargeable hours.
REFUELLING	Recharging and conventional refuelling.	Hydrogen refuelling only.
FUELLING AVAILABILITY	Widespread, as range-extender electric cars can top up with petrol at a filling station or recharge using a domestic supply or the charging network.	Very limited. There are very few hydrogen refuelling stations at present in the UK, with most located near London, and no established network yet.
ADVANTAGES	Less 'range anxiety' than a BEV as the combustion engine is refuelled conventionally to charge the battery, although with improved battery technology range anxiety is becoming less of an issue. EREVs are subject to BIK tax at 1% in 2021/22, with an increase to 2% in 2022/23 frozen at this level until 2024/25.	Ultra-clean operation and silence on the road. Hydrogen is potentially abundant and refuelling takes a similar time to petrol or diesel. Performance is similar to a conventional car with a range of around 300 miles before refuelling is needed.
DISADVANTAGES	Much improved battery technology in battery electric vehicles (BEVs) has outmoded EREVs and currently none are in production for new vehicle delivery. Fuel economy when the combustion engine is running can be disappointing, extra weight can compromise handling and fuel tanks for the range extender motor often tend to be small.	Expensive to buy and, at present, impractical as there is no established refuelling network in the UK. Hydrogen requires large storage tanks in the car that impact on interior space.
SUMMARY	With improvements in battery technology and range benefiting BEVs, manufacturers have moved away from range extender technology. But EREVs have no range anxiety issues and are classed as zero emission so are exempt from VED in 2021/22. Drivers of cars already registered are subject to BIK tax at just 1%.	In its infancy as a practical mobility solution but with potential. Infrastructure is needed to make it viable, but production and current purchase costs make it prohibitively expensive for most users.

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Alternative Fuel Comparisons (CONTINUED)

DRIVELINE	TRADITIONAL HYBRID Eg Toyota Prius non Plug-in Hybrid (Parallel Hybrid)
DESCRIPTION	A vehicle with a combination of a petrol or diesel engine and an electric motor to reduce fuel consumption and emissions.
GOVERNMENT PLUG-IN GRANT ELIGIBILITY	No. Only Government-approved cars with zero CO ₂ emissions qualify for the grant. Click the Government grants and incentives tab above for details.
BIK TAX AND VED IMPLICATIONS	The benefit-in-kind (BIK) tax system for company cars clearly incentivises the selection of zero or low tailpipe emission cars with a high battery range. Traditional hybrids have reduced CO ₂ emissions, but are more in line with the best petrol and diesel cars for BIK tax and fuel-efficiency. VED applies according to emissions of CO ₂ .
LONDON CONGESTION CHARGE ELIGIBILITY	Only vehicles that meet Euro VI standards (petrol and diesel), emit no more than 75g/km of CO ₂ and have a minimum 20-mile zero-emission range qualify for the 100% cleaner vehicle discount. From 25 October 2021, the cleaner vehicle discount will change so that only battery electric or hydrogen fuel cell vehicles are eligible. From 25 December 2025, the cleaner vehicle discount will be discontinued. From this date, all vehicle owners, unless in receipt of another discount or exemption, will need to pay to enter the Congestion Charge zone during chargeable hours. Taxis and Private Hire Vehicles are exempt from the charge if actively licensed with London Taxi and Private hire (TPH). To find out if your car qualifies for exemption or a discount, CLICK HERE .
REFUELLING	Traditional refuelling only.
FUELLING AVAILABILITY	Widespread, using the existing filling station network.
ADVANTAGES	Can be less expensive to buy than an electric car or plug-in hybrid. Does not require plugging in, and is refuelled like a conventional car. Several manufacturers offer traditional hybrids and the technology is now well understood after over 20 years on the market.
DISADVANTAGES	Electric assistance to the combustion engine makes it attractive in town and for short distances, while BIK tax can be reduced compared with conventional cars. Long-range motorway economy can be worse than for a conventionally powered non-hybrid that doesn't carry a hybrid's weight burden.
SUMMARY	Traditional hybrids have been accepted as an alternative to diesel by some fleets, particularly those based in urban areas.

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More information

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