Green machines

Eco-friendly cars are becoming more popular. But how much do they ease your conscience and cut your motoring bills? We took to the road to find out

Our love affair with the car shows no signs of abating. There are currently around 27 million cars on our roads and the Department for Transport predicts this figure could rise to 34 million by 2020. Fuel efficiency and emissions reductions simply can't keep up with such growth in numbers.

Forgoing a car completely is not an option for most of us – although choosing a cleaner car is. We've reviewed the latest options to help you make the switch.

Why go green?

The ever-increasing price of fuel as oil resources dwindle is one reason to choose a more fuel-efficient car – it will be easier on your pocket as well as the planet. Company car drivers can slash their tax bills by choosing a cleaner car, while private buyers will also pay less since the Chancellor recently cut road tax for green cars.

However, most eco-friendly cars are more expensive to buy than similar petrol or diesel models. Since the demise of the government's PowerShift grants last year, private buyers have had little to encourage them to go green – a situation that doesn't benefit consumers, the environment or car makers. However, the government is awaiting approval from the European Commission, due later this year, to introduce new grants for low-carbon cars. It's too early to say how much they will be worth, though.

Money issues aside, there's no dodging the environmental reasons for going green. Road transport is now responsible for 22 per cent of the UK's greenhouse gas emissions, while exhaust fumes contain pollutants known to damage health and contribute to climate change. And although modern diesel cars enjoy a greener image than petrol models – thanks to their lower carbon dioxide (CO_2) emissions – some can also degrade local air quality because of higher soot and particulate emissions.

The average private car sold last year produced 170 grams of CO_2 per

WHICH? TEST DRIVE

19% GREENER

Honda Civic 1.4 IMA Hybrid ES

WHAT IS IT?

A brand new Civic Hybrid saloon, which went on sale in April. It claims to be 20 per cent more powerful than the previous Civic Hybrid, making it a serious rival to the popular Toyota Prius.

HOW GREEN IS IT?

It shaves 19 per cent off the CO_2 emissions of the standard 1.4 Civic automatic, which itself is no heavy polluter. Official fuel economy figures state the Hybrid will return 61mpg – around 12mpg more than the hatchback. Honda claims it will save you £1,000 in petrol over three years and 36,000 miles. It costs from £16,275 on the road – a price premium of around £1,580 over the equivalent standard hatch – but £1,500 less than the Prius.

WHICH? VERDICT

The Civic feels sprightly enough, especially when you consider its small petrol engine and extra saloon bulk. But while the Prius can travel silently on its electric motor, the Civic's engine is always turning over, with the battery mainly helping when more pulling power is needed.

Used for typical rush-hour commuting, we managed only 28 to 34mpg – while this should improve on longer runs, it's still less than a small diesel car can achieve, and nowhere near Honda's claim of 54mpg around town.

We found the Civic's transmission and brakes could feel slightly jerky when crawling in low-speed traffic. But otherwise, it's nice to drive, with a quiet, comfy cabin. As a fuel-saving hybrid, though, we're not quite sure it adds up.

Cabin is simple and well built

CIVIC STATS

Price: £16,275 (ES) to £17,075 (ES + Leather)
Manufacturer's claimed fuel economy (combined): 61.4mpg
Fuel cost/yr (12,000 miles): £711
CO_2 emissions: 109g/km
Annual road tax: £40
Annual company car tax (22% taxpayer): £428 to £449

PHOTOGRAPHY DAN PULLEN

WHICH? TEST DRIVE

Toyota Prius 1.5 VVTi T-Spirit Hybrid

WHAT IS IT?

It's a hybrid family car that uses both a petrol engine and an electric motor to save on fuel and emissions. Image-conscious Hollywood celebrities (such as Nicole Kidman, below) and now UK government ministers have taken the Prius to heart.

Prius enjoys celebrity status

HOW GREEN IS IT?

It's the greenest petrol car you can buy in the UK. It emits less CO_2 than even the cleanest diesel supermini. Many petrol family cars pump out nearly twice as much, and the Prius cuts CO_2 emissions by 44 per cent versus a similarly-sized 1.8-litre Toyota Avensis auto.

It saves money at the pumps, too – we averaged 45 to 50mpg across a variety of driving routes. That's impressive but still a far cry from Toyota's claimed economy figures of 66mpg.

WHICH? VERDICT

All models use a smooth auto gearbox that switches power seamlessly between the electric motor and petrol engine, while the motor's battery is recharged whenever you brake or coast. The Prius is spookily silent (ask any surprised-looking cyclist or pedestrian), as the electric motor takes most of the strain around town. The petrol engine kicks in only when you need more acceleration or if the battery gets low. It's competent out of town, although it becomes a bit noisy at motorway speeds, when the 1.5-litre engine works hard.

Overall, the Prius is quiet and relaxing to drive, if a little underpowered on faster roads.

44% GREENER

It's a genuinely 'green' family car, but you'll need to cover many miles before low running costs offset the high list price.

PRIUS STATS

Price: £17,770 (T3) to £20,270 (T-Spirit)
Manufacturer's claimed fuel economy (combined): 65.7mpg
Fuel cost/yr (12,000 miles): £664
CO_2 emissions: 104g/km
Annual road tax: £40
Annual company car tax (22% tax): £467 to £533

WHICH? TEST DRIVE

27% GREENER

Lexus RX400h 3.3 SE-L CVT Auto

WHAT IS IT?

It's the only hybrid 4x4 in the UK. Twin electric motors and a 3.3-litre V6 petrol engine provide a powerful and unique four-wheel-drive system.

HOW GREEN IS IT?

Carbon dioxide emissions are 27 per cent lower than the petrol-only RX350 but are still similar to a 2.0-litre Ford Mondeo petrol estate. The hybrid system uses less fuel than petrol rivals but some diesel 4x4s are almost as frugal. The RX400h will appeal more to tax-conscious company car drivers than eco-warriors.

Display shows power usage

WHICH? VERDICT

The electric motor is quiet when pulling away from standstill. But for quick starts, put your foot down harder and the V6 engine thrusts the car forward at some speed, while the auto gearbox gives smooth and powerful progress throughout the range. The regenerative brakes – which recover some braking energy for re-use – are powerful, though characterised by a slight, unusual whine.

The RX400h returned between 25 and 34mpg on our mixed driving routes. And as a luxury 4x4 for use around town and on the motorway, it doesn't disappoint. But it's unlikely to have the same driving appeal, or eco-benefit, off-road.

RX400h STATS

Price: £36,335 (400h) to £45,200 (400h SE-L)
Manufacturer's claimed fuel economy (combined): 34.9mpg
Fuel cost/yr (12,000 miles): £1,250
CO_2 emissions: 192g/km
Annual road tax: £190
Annual company car tax (22% taxpayer): £1,827 to £2,109

Electricity and hydrogen are hotly tipped as the fuels of the future

kilometre. Although car makers have voluntarily agreed to reduce this average to 140g/km by 2008, there's little evidence to suggest this target will be met.

The European Commission's new Euro V emissions regulations, which aim to reduce car emissions by up to 80 per cent by 2010, don't impose limits on carbon dioxide output. Instead, they focus on capping cancer-causing and smog-forming particles. However, car buyers can keep up pressure on the industry by choosing one of the low-carbon cars available.

Are bio-fuels the future?

Cars that run on bio-fuels are becoming a very attractive prospect, as they can help reduce CO_2 emissions. As bio-fuels are produced from renewable crops, such as sugar beet, wheat, grasses and woodchip, CO_2 is absorbed from the atmosphere during the growing cycle. So although bio-fuel cars don't necessarily emit less CO_2 than petrol models, they do offer a net reduction of around 60 to 70 per cent.

Unlike hybrids, bio-fuel vehicles don't cost much more to buy than equivalent petrol cars and, perhaps surprisingly, can give slightly better performance, too.

Another benefit of bio-fuels is that they don't require major changes to fuel pumps or engine technology. For example, bio-diesel can be used in most modern diesel engines that will take ultra-low sulphur diesel without any modification, in blends of up to 5 per cent. However, if you use a blend of more than 5 per cent bio-diesel, this may invalidate your warranty, due to the risk of bio-fuel corroding engine seals and fuel lines – check with your dealer.

Bio-fuel cars can cut carbon dioxide emissions by 60 to 70 per cent

All petrol cars can safely run on petrol mixed with 5 per cent bio-ethanol, though, again, most warranties currently cover only cars using a blend of 5 per cent or less.

Driven by alcohol

Bio-ethanol is alcohol that works as a petrol substitute. It has become very popular in Sweden – 13 per cent of all new cars sold there in February run on it. Two popular models are now also on sale in the UK.

The 1.8-litre Ford Focus FFV (Flexi-Fuel Vehicle) runs on E85 fuel, which is 85 per cent bio-ethanol and 15 per cent petrol. It also takes normal petrol when E85 isn't available. The beauty of this is flexibility – there's just one tank for both fuels and the engine management system automatically works out the blend of fuel you're using. Prices start at £14,245 – only £200

WHICH? TEST DRIVE

Citroën C3 Stop & Start

WHAT IS IT?

It's a supermini with a clever 1.4-litre petrol engine that turns off when stationary (at traffic lights, say). There's a combined starter motor and alternator, combined with a back-up battery – all of which help to start the engine more swiftly than a conventional starter motor would. After all, you don't want to get stuck at the traffic lights.

HOW GREEN IS IT?

Citroën claims combined fuel consumption of 49.6mpg. During our time with the car, we averaged 40mpg from a range of driving. Ultimately, the fuel consumption is disappointing, as the Stop & Start shows only marginal improvements over the standard 1.4 'auto-manual' model – and it shaves only 6 per cent off the CO_2 emissions, too.

It's arguable whether the Stop & Start really saves much fuel, especially if compared with other efficient superminis like the Citroën C1 and Toyota Aygo.

WHICH? VERDICT

In practice, the Stop & Start system works well enough, though there are times when the engine won't shut down while stationary – if the engine is warming up or if car battery charge falls below a certain level. And more annoyingly, using the handbrake overrides the engine shutdown feature.

Bear in mind that while Stop & Start technology will help save fuel and emissions when you come to a total standstill, it doesn't have the same benefits in slowly creeping urban traffic.

One such Friday evening crawl out of London was a stern test for the Citroën. The constant stop-start driving caused the headlights to flicker at times.

The auto-manual gearbox is pretty good in urban traffic but it struggles when asked to accelerate hard, with lurchy gear changes. It can also be a bit unpredictable when parking.

Citroën and sister company Peugeot plan to introduce Stop & Start technology to their C4 and 307 hatchback ranges respectively, before 2010. Citroën also sells the smaller C2 Stop & Start at £10,690

C3 STOP & START STATS

Price: £11,540 (one model only)
Manufacturer's claimed fuel economy (combined): 49.6mpg
Fuel cost/yr (12,000 miles): £880
CO_2 emissions: 135g/km
Annual road tax: £100
Annual company car tax (22% taxpayer): £376

A Ford Focus FFV fills up on E85 bio-fuel, as Morrisons opens the first UK pump in Norwich

more than the regular 1.8-litre petrol Focus it competes with – and Ford claims a 70 per cent reduction in CO_2 emissions.

The Saab 9-5 BioPower, which costs from £21,867, can also run on E85 or unleaded petrol. The engines in both cars have had minor adjustments to prevent corrosion from the bio-fuel.

More bio-fuel pumps needed

One of the main barriers against adopting alcohol-powered cars at present is the lack of places to fill up on E85 fuel.

Last year, the government announced that, by 2010, companies will have to blend all the petrol and diesel they sell on forecourts with 5 per cent bio-fuel. But in many cases a mix of 95 per cent normal diesel with 5 per cent bio-fuel is already available at the pumps, and 5 per cent bio-ethanol in petrol is also not uncommon. So this isn't a huge commitment from the government.

In March, ten Morrisons stores in East Anglia and the West Country started selling E85, for 2p a litre less than petrol. But bio-ethanol needs to be cheaper than this, as fuel economy is around a third lower than when the car is run on petrol.

So even though fuel duty on E85 is currently 20p a litre less than on petrol, higher production costs mean it costs drivers more in the long run. We think the government needs to introduce greater incentives to convince private and company car drivers to switch to bio-fuels – in Sweden this has been done very successfully.

Other options

Liquid petroleum gas (LPG) faces stiff competition from hybrid cars and other alternative fuels. In October 2004 the Queen had her entire fleet of cars converted to run on LPG but royalty (and John Prescott) aside, just one in 200 of us has switched to the fuel. Since PowerShift grants were scrapped, sales of LPG cars have dwindled, although there are still some 1,300 refuelling sites nationwide.

Electricity and hydrogen are hotly-tipped as the fuels of the future. However, electric cars are limited by a lack of speed and range and are environmentally friendly only when charged with cleanly-generated electricity. The only electric car sold here is the tiny G-Wiz city car (see 'Future technology today', November 2005, p24). Expect to see more appearing as battery technology improves, though.

Hydrogen remains a tempting green fuel, since the only by-product is water. Several car manufacturers have developed prototype hydrogen cars but none is yet commercially available – hydrogen fuel cells are still about ten times too expensive to be viable. It also takes a lot of energy to manufacture hydrogen, so until renewable hydrogen is available it is not a truly environmentally-friendly solution.

In 2004, the Queen had her entire fleet of cars converted to run on LPG

Checklist

We can all do our bit for greener motoring

Buy a greener car

- Consult colour-coded A-G labels in new-car showrooms. These look similar to energy labels used on household appliances and show fuel economy and CO_2 emissions.
- Check CO_2 emissions before buying – are they below the 170g/km average?
- Consider downsizing. A smaller, cleaner engine may meet your needs just as well.
- Consider a hybrid car. These are now a practical option and there are some good hybrids to choose from.
- Check fuel availability before buying an alternative fuel car. Some fuels, such as bio-ethanol, are in their infancy.
- Some alternative fuel cars are exempt from London's congestion charge – other cities are also trialling this.

Greener driving

- Where possible, rather than braking, take your foot off the accelerator and, without changing gear, allow the engine to slow the car down.
- Drive as smoothly as possible, avoiding harsh acceleration and braking.
- Try to keep the car moving, instead of stopping altogether, where possible. It's less efficient to keep starting from standstill.
- To improve fuel economy and keep emissions down, check tyre pressures every fortnight and follow your car's regular servicing schedule.
- Don't carry anything that you don't need – extra weight uses extra fuel. In addition, remove roof racks when not in use.
- Ultimately, drive less. Walk, cycle, take public transport or offer lifts whenever possible.