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# Toyota Prius Hybrid Plug-In PHEV Road Test

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Toyota adds Plug-In PHEV versions to the firm's Prius Hybrid range.

David Miles (Miles Better News Agency) test drives one...

My week long road test in the new Toyota Prius Plug-In Hybrid (PHEV) created two notable firsts for me. It was the first road test production car I have tested with a solar roof and it was the first test car to return over 100 mpg for a full week of motoring.

The sales success of PHEVs has created the driving force for increased demand of Alternatively Fuelled Vehicles in the UK because of their official low CO2 emissions and hence low Benefit-in-Kind tax penalties for fleet and business customers, as well as lower



rate VED road tax costs for all drivers.

Just as long as drivers/owners have those all important registration documents which state the low CO2 figures then the tax costs are impressively low, whether the drivers actually use the plug-in facility or not.

The headline figures for the new Prius Plug-In are a Combined Cycle fuel consumption figure of 283 mpg and CO2 emissions of 22 g/km. The latter figure means VED road tax is £0 for the First Year rate but then bizarrely for the second year onwards it costs £130 for the Standard Year rate. This is unfairly just £10 less than other new gas guzzling vehicles registered after the 1 April this year and these include high powered sports cars and heavyweight 4x4s. Best news is for company car users as the 22 g/km CO2 figure means only 9% Benefit-in-Kind tax whilst a conventional Prius with 70 g/km of CO2 is rated at 13% with VED costs at £15 First Year rate and £130 annually thereafter.

Conventional Prius hybrid non plug-in five seater models range in on-the-road prices from £24,115 depending upon the specification level to £28,345 and use a 1.8 litre 122 hp petrol engine and single electric motor with a CVT auto transmission. There is also the Prius+ range of seven-seat MPVs priced from £27,660 to £31,930 with a 1.8 litre 136 hp petrol engine and electric motor.

The new Prius Plug-In Hybrid four seater models are eligible for the Government's £2,500 plug-in car grant and its two variant range, plus the solar roof option, starts from £29,195 and goes up to £31,395 with the £2,500 grant taken. Again the 1.8 litre petrol engine is used with 122 hp, aided by two electric motors, it has a higher capacity faster charging battery pack and CVT transmission. The new vehicle also has two world firsts; an EV range-extender solar roof option and gas injection heat pump air conditioning, in addition to two Toyota firsts in the form of a Battery Warming system for maximum efficiency in cold weather and the Dual Motor EV drive system.





During my week of test driving covering my usual short trips into my local village, longer drives through the winding Cotswold roads to motoring events and a 160 mile journey using mainly motorways, the real-life fuel consumption figure was 103.2 mpg. This was impressive for sure and it was not 'economy driving' by me, just the normal way I would drive most test cars. But as impressive as this figure was, it was still less than half the official Combined Cycle 283 mpg Combined Cycle figure. At times the on-board computer regularly showed 200 mpg and it was only a couple of short-ish runs with no electric power left in the battery and the longer high-speed motorway journey after the battery power was used up, that dropped the figure to a shade over 100 mpg. Without battery power available the vehicle returned 82.3 mpg.

PHEVs don't perform best for fuel economy being driven at high speeds over long distances,



they perform best for shorter trips at low to medium speeds. To get close to the official figures the plug-in electric charging facility must always be used but in reality most drivers don't always bother, they just like the low tax costs.



The new Prius PHEV is capable of more than 30 miles in electric power only mode at speeds up to 84 mph rather than 53 mph for other Prius versions. With the EV driving range extended from 15 miles for other Prius models to over 30 miles, for 'eco warrior' drivers it is quite possible to use no petrol at all for short commuter trips for shopping or work, providing that the battery is charged from the mains electricity supply on a regular basis. With this new model, charging speed has been increased by 65% to provide a two hour full charge from public charging points or a wall-box charging point, or around three hours from a domestic 240-volt 13amp supply. The large capacity lithium-ion battery has doubled from



4.4 to 8.8 kW/h, the volume is increased by two thirds from 87 to 145 litres (3.07 to 5.12 cu.ft) and weighing 120 kg (265 lb) it is only 50% heavier than its predecessor.

Because of the larger battery pack mounted under the boot floor the luggage space with the shallow boot is reduced to 360 litres (12.71 cu.ft) although the seat back can be flipped forward to increase that space up to a maximum 1,204 litres (42.52 cu.ft). Another loss is the rear seat configuration. The Prius Plug-In has only two rear seats instead of three, with the middle seat lost to accommodate a console which houses electrics for the larger battery. Whereas conventional five seat Prius models have proved popular for city/town taxi use the loss of one seating position will be an issue.

This slideshow requires JavaScript.

The new PHEV styling changes to the fourth generation Prius Hybrid use the same new and more much acceptable designed body with additional aerodynamic winglets, fins and shields used to guide wind over and around the sleek body shape. The PHEV versions have longer front and rear bodywork overhang sections, plus a unique grille design at the front, and the rear bodywork has been extended to accommodate storage of the electric charging cables which are housed just in front of the rear sill so they are easy to get at without unloading luggage. There is a full width tailgate spoiler with integrated rear lights at each corner, leading into the rear wings. This spoiler has a dish-shaped mid-section, as does the 'double-bubble' rear tailgate window which further speeds up unrestricted air-flow from the roof over the rear end and away, minimising drag from air turbulence. To minimise drag and to provide ride comfort the Prius PHEV rides on 15-inch alloy wheels.

At this point I'll mention the solar roof option which consists of smart looking lines of power-gathering elements imprinted into the roof, giving it more of a personalisation theme and for some eco warriors that will be desirable. The cost of £1,500 for the solar roof option is high and the added efficiency in the UK climate is minimal but it's a good talking point. Toyota says the solar roof can provide around 400 miles of all-electric driving a year in UK city traffic, up to three miles a day. The solar roof option is available for the Business





Edition spec level where it becomes the Plus variant, but the top of the range Excel level does not have this option.



As for equipment, both spec levels have Toyota Safety Sense as standard, which includes Pre-Collision Warning and Pedestrian Detection, Lane Departure Alert, Adaptive Cruise Control and Road Sign Recognition, Blind Spot Monitor and Rear Cross Traffic Alert. Dual zone air-con, rear passenger footwell heating and Smart Entry and Start are also included. Specific to the Business Edition Plus model I tested are spec items such as Toyota Touch 2 Go touchscreen multimedia and navigation, heated door mirrors, rear view camera, dusk sensing LED headlights, colour head-up display, Bluetooth connectivity, heated front seats and a very good DAB radio and sound system.



The Prius PHEV is quite a complex vehicle to first understand the various powertrain and driving modes but once understood it all seems logical. There are four different powertrain modes. One is HV mode providing power from the engine and both electric motors. Two is EV mode primarily using battery power and includes a selectable EV City third mode to run on electric power as long as it is available and then the engine starts up. Mode four Uses HV and EV mode together for the engine to generate electricity to charge the battery while driving in HV mode. In addition there are three on-demand driving modes, Normal, Power and Eco. From start up and at lower speeds in Normal mode the car automatically runs in EV mode before the engine cuts in when needed. In Power mode the throttle responses are sharpened up and in Eco mode the throttle responses are more lethargic and the air-con support lowered.





There is no doubt the 1.8 litre engine and CVT transmission partnership works best when the electric motors are running. There is the usual primary one used for all Prius models, plus a supplementary one which is actually the generator which now doubles up as a motor. They provide more torque for better acceleration response so the CVT auto gearchanges are smoother and generally it has a quieter and more polished performance. Although the Prius PHEV also has regenerative braking to capture electricity power for the battery it is always desirable that no matter what type the journey is, the plug-in facility must be used as often as possible. When the car runs out of electric support the engine and CVT transmission can feel and sound strained under acceleration and going up steep hills. Whilst the hybrid system does away with range anxiety and the car copes with long motorway journeys, I found it nicer to drive and less costly to use for shorter commuter journeys. On the open road it is not a quick car with a modest top speed of 101 mph and zero to 62 mph takes 11.1 seconds. The ride comfort was good, the handling safe, but the steering feedback felt



'artificial' and it didn't provide agile handling due to its overall weight.

## VERDICT

In short the new Toyota Prius PHEV has its benefits in terms of low tax costs and fuel economy potential but it also has its limitations when the electric support runs out on long motorway journeys.

For: Distinctive styling, smart interior, high specification, low running costs, very low personal company car tax, ideal for shorter commuter trips or in town driving, impressive real-life test driving fuel economy of 100mpg+.

Against: Expensive to buy, only four seats instead of the standard Prius Hybrid five seater versions, noisy petrol engine under acceleration once battery power has been used up, loses out in the recent VED Standard Rate road tax changes, in real-life driving conditions it still didn't match the official Combined Cycle fuel economy figure.





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Milestones and Wheels-Alive Tech. Spec. in Brief:

**Toyota Prius Plug-In Business Edition Plus.**

Price: Including the £2,500 Plug-In Vehicle Grant £30,695.

Engine/transmission: 1.8 litre, four cylinder VVT-i petrol engine supported by twin electric motors, 122 hp/90 kW, 142 Nm (105 lb.ft) of torque, CVT auto transmission.





Performance: 101 mph, zero to 62 mph 11.1 seconds.

Fuel consumption: Combined Cycle 283 mpg (103.2 mpg on test).

Emissions and taxation: CO2 22 g/km, VED road tax First Year rate £0 then the Standard rate of £130 for year two onwards, BiK company car tax 9%.

Insurance Group: 21E.

Warranty: Five years/100,000 miles.

Dimensions/capacities: L 4,645 mm (15.24 ft), W 1,760 mm (5.77 ft), H 1,470 mm (4.82 ft), boot space 360 - 1,204 litres (12.71 - 42.52 cu.ft), five doors/four seats.