Hydrogen powered Toyota Mirai saloon – Brief First Impressions

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Kim Henson test drives the futu

(All words and photos by Kim)

'Bringing the future into the present' is how Toyota headlines its revolutionary Mirai, the company's hydrogen fuel cell vehicle – and the world's first to be mass-produced – that represents the culmination of 22 years of research and development.

Of course Toyota is already long-famous for its pioneering work with hybrid models (which incorporate internal combustion and electric motors), but the practical use of a hydrogen fuel cell for a vehicle that can be used in daily motoring is a further step towards long-term

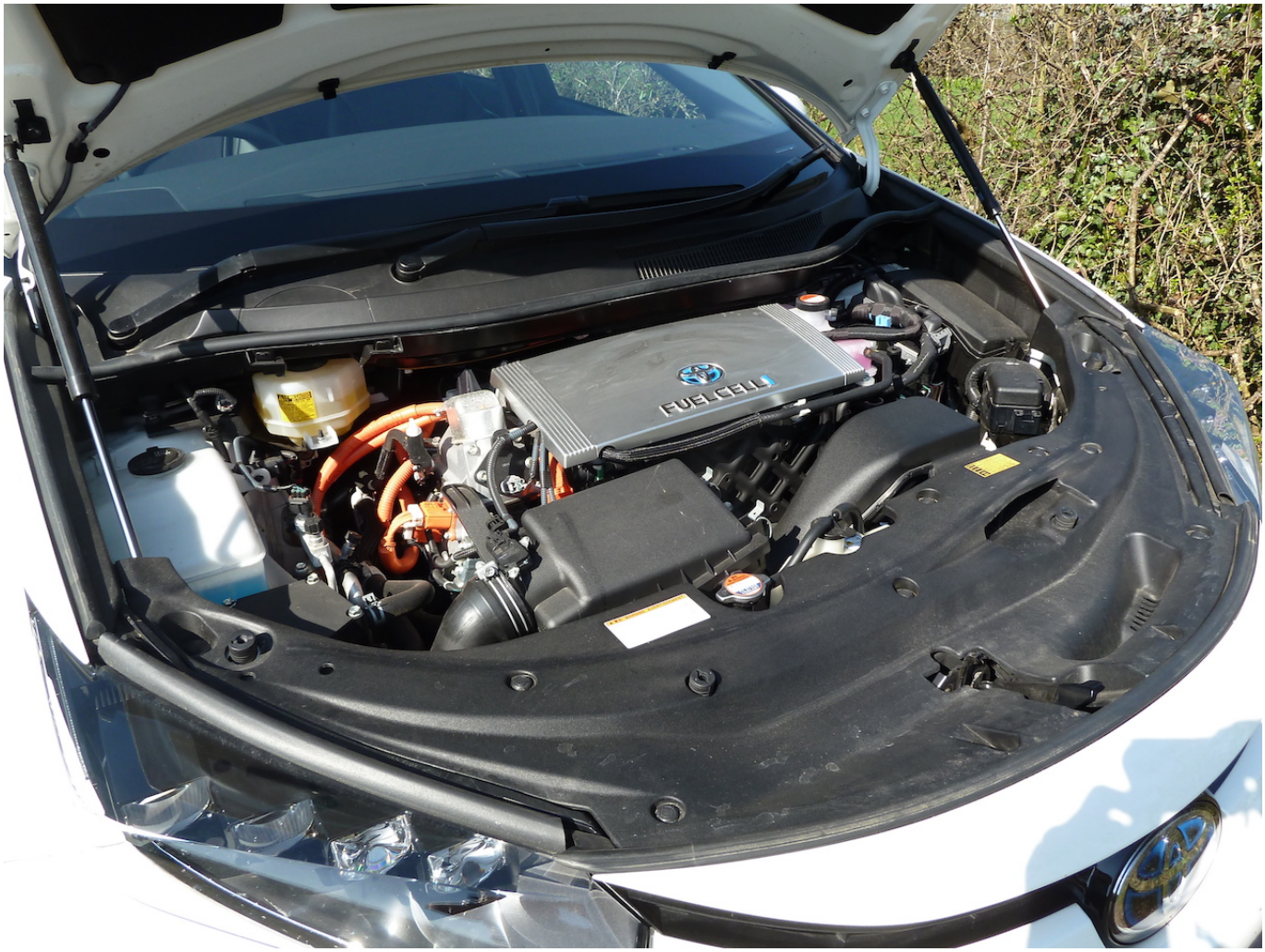
sustainability in minimising the use of the earth's resources and reducing harmful emissions.

Indeed, in essence the propulsion system uses hydrogen (abundantly available on our planet) to produce electricity to power the vehicle, with the only emissions being water (from the tailpipe).

The set-up enables long-distance zero-emission motoring to be undertaken, with no need for electrical plug-ins to recharge, although of course the car does have to be refuelled with hydrogen. The infrastructure to facilitate this is growing, and the more hydrogen powered vehicles that are produced, the more refuelling stations will appear to serve them.

How it works – in brief

The hydrogen taken on board is stored in two lightweight but ultra-strong carbon fibre tanks. A fuel cell stack combines the hydrogen with oxygen from the atmosphere (funnelled into the vehicle via a vent at the front of the car), to produce electricity.



The underbonnet-mounted power control unit manages the power produced by the fuel stack and separate nickel-metal hydride battery (which stores energy recovered during decelerating and assists the fuel stack when more power is needed during acceleration), and governs power supply to the electric propulsion motor.

The large vents on each side at the front of the car channel cooling air towards the Mirai’s radiators.



Interestingly, Toyota acknowledges that it cannot run an alternative fuel revolution on its own, and accordingly has made available to other car manufacturers more than 5,000 fuel cell patents, to use on a royalty-free basis.

On the road

I was interested to experience the Mirai in real-life driving conditions, having briefly driven Honda's hydrogen powered FCX Clarity a few years ago, when there were just two pre-production examples in Europe, and just two hydrogen refuelling stations in the UK… I had been impressed by the Honda's smoothness and ease of driving, but at that stage the car was not available for purchase.

Things have moved on in recent years, and although production is currently limited, the Mirai can be yours now if you are prepared to be an ‘early adopter’ of the innovative technology incorporated into this vehicle. Interest from prospective buyers can be registered at www.toyota.co.uk/mirai and Toyota says that it will then contact people expressing this interest, to discuss requirements/vehicle suitability.

I should add that the car is also ‘state-of-the-art’ in terms of its construction, safety aspects (including pedestrian protection) and equipment, but for this feature I’ll concentrate on its hydrogen stack propulsion system.

First of all, what about refuelling? Well it is said to take between three and five minutes only (far less than the time needed to recharge a conventional electrically-powered car) and to provide a driving range of up to 342 miles (so in practice expect rather less…). The cost of filling the tanks is said by Toyota to be about the same as refuelling a conventional petrol car.

Currently, refuelling stations to be found in Britain are in London (five of them), with others at Swindon, Sheffield and Aberdeen, also at Cobham Services, with more due to open soon.

The futuristic, comfortable interior of the Mirai impressed me (although it’s only a four seater, and boot space is also somewhat compromised by the necessity to accommodate the car’s complex running gear), as did the ease with which the car can be driven. Indeed the controls are no more difficult to assimilate than for a conventional automatic vehicle, with a simple drive controller protruding from the centre console to operate the vehicle’s drive functions. And there are additional controls for the electrically-operated parking brake.





As you proceed, the instrumentation keeps you informed in terms of power delivery, and although the display can seem complex to start with, in fact it’s straightforward, and easily understood within a few miles’ driving.

From rest the car accelerates smoothly, quietly and uncannily, with just a hushed ‘whoosh’ if increasing speed rapidly, to let you know that the electric motor is working.

The car gains speed quickly when required, both from standstill and when on the move, and power production feels seamless all the way up to motorway cruising speeds. Again these are accomplished in near-silence.

Hill-climbing and descending steep slopes presented no difficulties, and the car was also happy to meander along slowly in heavy traffic, when required.

During my brief drive I didn't refuel the vehicle, but I have seen hydrogen cars being refuelled and this should not be an onerous chore – in fact it should typically be just as easy, and take less time, than filling a tank with petrol or diesel fuel.

Ride and handling characteristics were impressive (MacPherson strut front suspension, torsion beam at rear), as were steering (electrically-assisted) and braking (ventilated discs front and rear); the car felt well-balanced on the twisty roads I sampled during my test run.

VERDICT

Brilliant; the future has arrived. The huge potential of the fuel cell stack propulsion system for 'everyday' cars produced in large numbers is now within reach, and the Mirai shows just how well the technologies can be harnessed to produce a practical vehicle providing a long driving range, and at the same time producing no exhaust emissions other than water.

For: Excellent driving characteristics, long range between refuelling stops, zero exhaust emissions.

Against: High purchase price, only four seats, relatively limited boot space, limited number (so far) of hydrogen refuelling stations.



Wheels-Alive Tech. Spec. in Brief:

Toyota Mirai saloon

Propulsion: Toyota Fuel cell System (370 cells in polymer electrolyte system); Nickel-metal hydride battery, 34 cells (244 volts nominal voltage)

Transmission: Electric; front wheel drive

Power: 153 bhp

Torque: 335 Nm (247lb.ft)

Performance

0–62 mph: 9.6 seconds

Top Speed: 111 mph

Fuel Consumption (Official Figures)

Urban: 0.69 kg/100km

Extra-Urban: 0.80 kg/100km

Combined: 0.76 kg/100km

Fuel tank capacity (approx.): 5.0kg

Drag coefficient (Cd): 0.29

CO2 emissions: Zero!

Taxation: VED Band A, Benefit-in-Kind 7%

Insurance group: TBA

Mechanical Warranty: Five years/100,000 miles, pan-European (plus thee year paintwork and 12 year anti-corrosion warranties).

Price (On the Road): £66,000 (£61,500 after OLEV – 'Office for Low Emission Vehicles' – Grant)