Toyota Mirai (Hydrogen Fuel Cell Car) Test-driven

Published: September 26, 2016

Author:

Online version: https://www.wheels-alive.co.uk/toyota-mirai-hydrogen-fuel-cell-car-test-driven/



Chris Adamson tests the 2016 World Green Car – the new hydrogen powered Toyota Mirai…

(Words and photos by Chris).

Dwindling and increasingly expensive reserves of petroleum products and increasing pollution of our planet from burning fossil fuels means that a cheaper, cleaner and more efficient way of using the earth's resources is needed if we are to retain our access to personal transport… ie the motor car.

At one time, electric vehicles were hailed as the way forward but they still rely heavily on the consumption of coal or gas to create the electricity in the first place, and not one has yet come up with a battery that is both weight-efficient and powerful enough to take cars long distances.

Hybrid cars that combine electric motors with conventional petrol or diesel engines are more practical but hardly resolve the prime objective of motive power without burning oil.

The real holy grail is a fuel cell vehicle – one that uses an alternative, readily available and cheap source of energy without producing harmful emissions.

The best solution we have so far is hydrogen power and now, for the first time, British motorists (well at least a select few) can purchase a vehicle that runs on this emission's free resource, and at £61,000, the Toyota Mirai isn't a hyper expensive or totally weird looking form of conveyance.

Coming from the company that got things going in the eco class with the Prius, the Mirai is already staking its credentials by being named the 2016 World Green Car following in the wheel tracks of the BMW i8 and Tesla Model S.

Closer to home, the British based magazine *AutoVolt,* which is dedicated to electric and hybrid vehicles, has named it their Car of the Year for 2016.

Mirai is claimed to be the world's first mass-produced fuel cell vehicle and runs on electricity created on demand by hydrogen with the only emission produced in this process

being water vapour, which means Mirai is exempt from Vehicle Excise Duty.



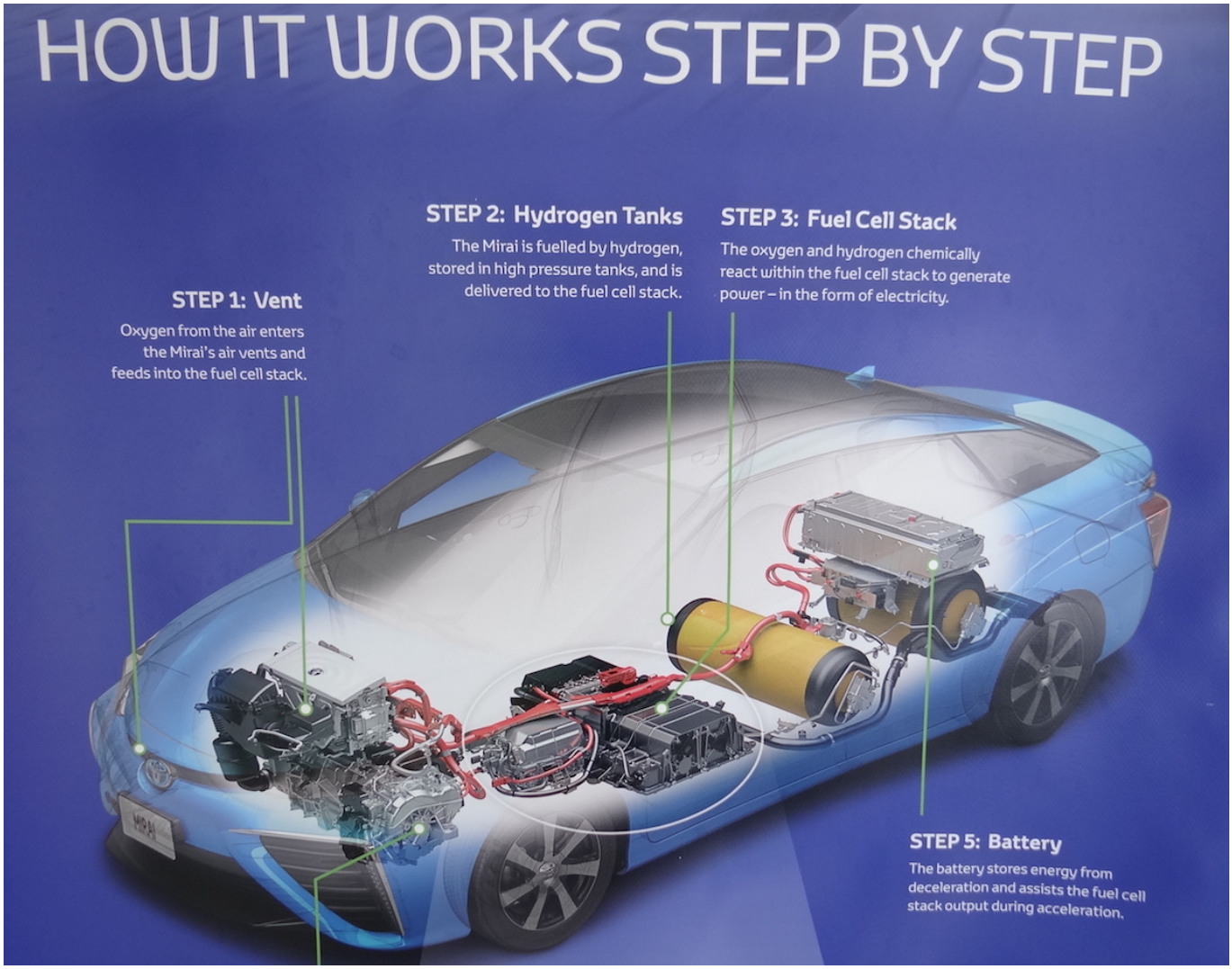
Hydrogen (which can be sourced from natural reserves or man-made products) is stored at high pressure (700 bar, or over 10,100 psi) in a series of light weight, three-layer, carbon fibre reinforced tanks and generates electricity on demand through a chemical reaction with oxygen in a Toyota-designed compact fuel cell stack located underneath and in the centre of the vehicle, where it is best protected from impact damage in an accident.

Power, which is stored in a 245V sealed nickel-metal hydride rechargeable battery pack (positioned in the rear of the vehicle but still leaving space for a 361 litre or 12.75 cu.ft

boot) is boosted by a high-capacity converter that increases the output to 650 volts which, in turn, has allowed the boffins to reduce the size of the electric motors and fuel cells.

The stack has a maximum output of 153 bhp (114 kW) which drives a permanent magnet electric motor located in the front of the car (so under the bonnet things looks slightly conventional) delivering motive power to the front wheels.

Refuelling takes around three minutes – much the same as a petrol car and certainly far quicker than recharging conventional electric battery packs and, in tests, Toyota has achieved the equivalent of 67 miles to the gallon giving Mirai an estimated range of 312 miles on a single tank of fuel.



At first glance the Mirai could be any large sporting saloon (even if Toyota chose to wrap the version I was driving in aluminium foil), but peer closer and you see a lot of rather strange and slightly ungainly sculpture work on the body panels.

This is headed by a mammoth front grille; it's as if someone has peeled away the front bumper to leave its innards exposed – not the most aerodynamic of assemblies but it should be great for drawing air to supply both oxygen and, at the same time, cool the motor.

Then there are the impossibly thin headlights (four LEDs) slotted in below the clamshell

bonnet and the over-exaggerated wheel arches front and rear – someone certainly went to town on the clay modelling when this was first conceived.

Appearance is going to be a matter of taste, as is the high-tech interior with the massive central console that compartmentalises the front seats into very distinct areas.

Out goes any conventional gear lever and instead there is a tiny joy stick positioned in the middle of the console, looking more like a video game control and, with a screen above and below it, the similarities continue.

But it is a comfortable enough cabin with good rear seat space and, at least, there is a steering wheel that looks very familiar so the driver gradually starts to feel at home.



And there are plenty of creature comforts such as eight-way powered and heated front seats, air conditioning, multi information 4.2 inch display screen, rain-sensing wipers, rear-view camera (needed as the boot lid is quite high), 11 speaker JBL sound system, Toyota Touch 2 with Go Plus navigation and multimedia pack and there is even a heated steering wheel for those cold winter nights.

For increased safety, Mirai is fitted with a pre-collision warning system, lane departure alert and a radar controlled blind spot mirror.



On the Road

Press the starter button and again it's more a video game time with no perceptible start-up sound – more in hope than expectation you press the accelerator and away she goes, whirring like a giant sewing machine.

Response to the throttle is instantaneous and linear, the harder you press the faster it goes (up to the 11 mile limit) and the higher the whine of the motors – in some instances it sounds more like an aircraft on a runway taking off than a car.

This is a feature of the motor that has a generous 335 Nm (247 lbf/ft) of torque available at

the end of the drive-by wire connections before the power reaches the 17 inch alloy wheels at the front.

Toyota claims a sub-10 second sprint time to 62 mph and it's easy to believe as the instant reactions immediately pull the bulk of the Mirai along, while lifting off suddenly retards progress – a sensation which initially needs a bit of adaptation to your normal driving style.

Braking in this case also helps in the regeneration of power as well as bringing everything calmly to a halt.

Some might find the steering feedback from the rack and pinion layout a little lacklustre and it can be a tad on the lifeless scale; this is, perhaps, in part due to the lack of accompanying engine tone, but it feels poised, relaxing and assured if unspectacular.

The bulk of the vehicle and the weight it is carrying means that Mirai is a sizeable piece of metal to push around but the conventional set-up of MacPherson strut front and torsion beam rear suspension copes well, even making the handling feel light and free-flowing.

The chassis balance is stable enough with a good weight balance and low centre of gravity, thanks to the various components being dotted around the car.



The Mirai being driven enthusiastically (not, in this case, by Chris) at Gurston Down hillclimb.

VERDICT

Mirai may not be the prettiest car you could imagine and it certainly isn't the most sporting but it could well be the clearest indication yet of the future of the motor car and at an affordable price.

Electric cars have still to solve the problem of limited distance; hybrid cars still rely on fossil fuels in one form or another so fuel cell vehicles such as the Mirai have to be the way forward.

But before you get too enthusiastic there is still one major stumbling block….. where do you re-fuel a hydrogen car.

At the moment there are just a handful of hydrogen fuel stations open in the UK so getting anywhere is very restrictive. A major investment in a hydrogen network is required to make this type of vehicle practical and as yet no-one is doing that.

Mirai is a brave and positive step forward in a world that could one day need that bravery.



Wheels-Alive Tech Spec:

Vehicle: Toyota Mirai

Engine: Toyota Fuel Cell and Permanent AC synchronous electric motor

Transmission: Automatic

Power: 152 bhp (114kW)

Torque: 335 Nm (247 lb/ft)

Performance:

0-62mph: 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/10km (equivalent to 67 mpg)

CO2 Emissions: Zero

Price (On the Road): £66,000 (before £5,000 OLEV grant)