

# MIRAI

FUEL CELL VEHICLE



**TOYOTA**

ALWAYS A  
**BETTER** WAY



# MIRAI

## BRINGING THE FUTURE INTO THE PRESENT

**We've always imagined a time when driving a car would leave no mark on the planet we live on.**

**Twenty years ago, our vision took a step closer to reality when we pioneered hybrid technology. The flexibility of our hybrid architecture means it can be adapted to different powertrains – from plug-in hybrid to hydrogen fuel cell – offering us a wealth of opportunities for new developments in the future.**

**Toyota Mirai is at the forefront of a new age of hydrogen fuel cell cars. Hydrogen energy enables us to enjoy zero-emission driving, unlimited energy supplies from various sources and provides an intelligent solution to store energy.**

**Hydrogen technology truly represents a turning point in our future mobility and for our environment. Toyota is making a start today, bringing the future into the present.**



# WHAT IS A FUEL CELL VEHICLE?

Think of a fuel cell vehicle as a hybrid car where the petrol tank and combustion engine are replaced by a hydrogen tank and a fuel cell stack. This revolutionary new system does not operate with petrol, but with hydrogen – a fuel with fascinating qualities and vast potential for the future.

The hydrogen is stored in two tanks under the cabin of the Mirai and reacts with oxygen from the outside air to produce electricity. This electricity powers a motor that drives the wheels; and the best news is that the only by-product of this process is water, which exits through the Mirai's tailpipe.

As well as only producing water from its tailpipe, which means less impact on our planet, Mirai's feel-good driving experience is guaranteed to leave a lasting impression, on every journey.



**0 EMISSIONS**



**REFUELLING TIME  
3-5 MINS**



**RANGE\*  
UP TO 342 MILES**

\* Estimated, according to NEDC Cycle. As measured by Toyota when refuelling at a hydrogen station supplying hydrogen at a pressure of 70 MPa under SAE J2601 standards (ambient temperature: 20°C; hydrogen tank pressure when fuelled: 10 MPa). Differing amounts of hydrogen will be supplied to the tank if refuelling is carried out at hydrogen stations with differing specifications, and the cruising range will therefore also differ accordingly. Possible cruising range may vary due to usage conditions (weather, traffic congestion, etc.), vehicle weight and driving methods (quick starts, air conditioning, etc.). Refuelling stations must comply with SAE J2601 and vehicles must be refuelled at 70 MPa.

# HOW IT WORKS

**1** Oxygen from the air enters Mirai's air vent.

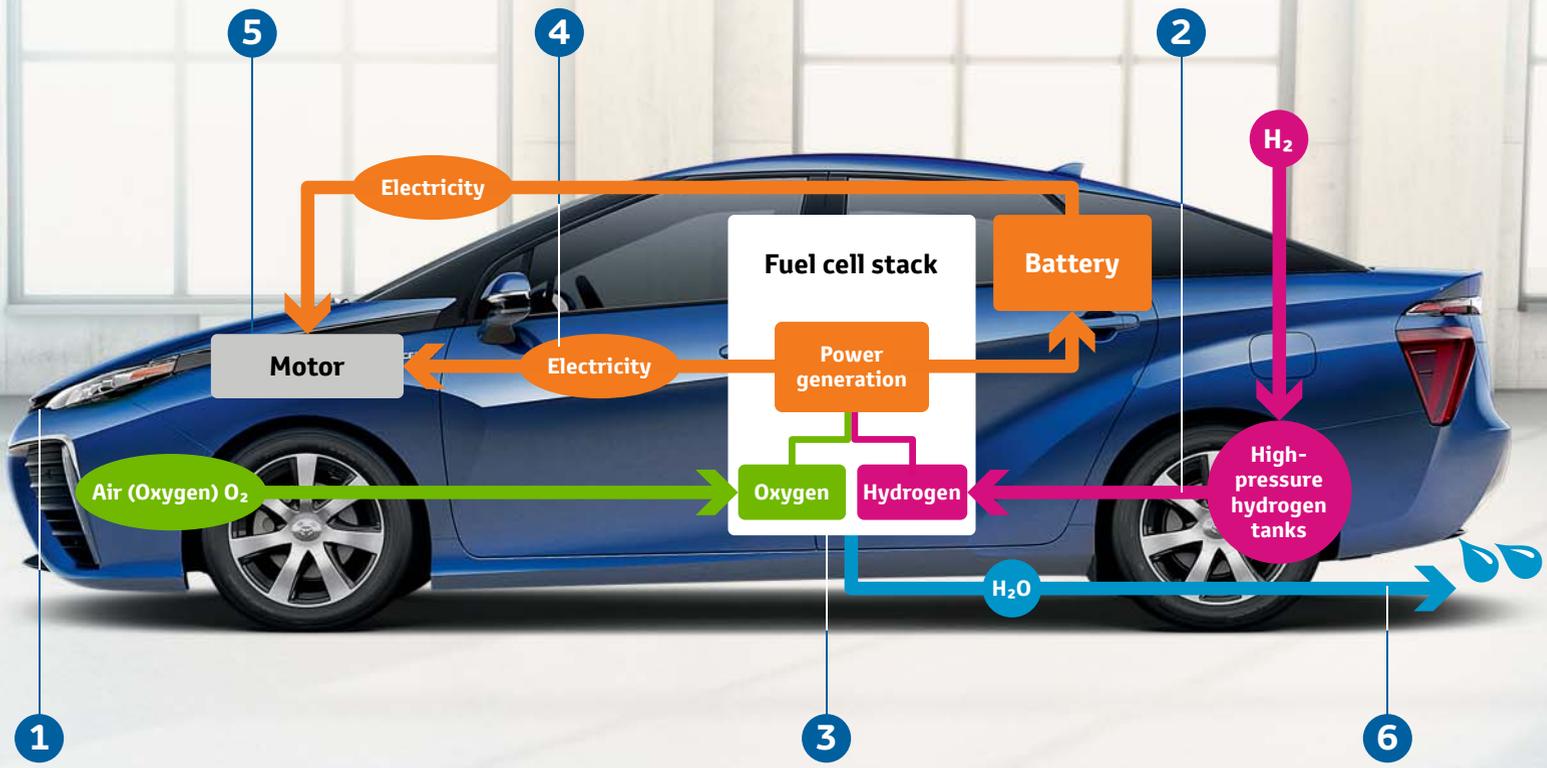
**2** Hydrogen is delivered to the fuel cell stack.

**3** Electricity and water are generated through a chemical reaction.

**4** The electricity powers the motor.

**5** The motor is activated and the vehicle moves.

**6** The only by-product of this process is water.



# SIMPLE TRUTHS

## Q HOW DO I REFUEL A FUEL CELL CAR?

A You can refuel in approximately three to five minutes at a hydrogen station using a pump – much like a petrol station pump – with no odour or risk of spillage.

## Q HOW MUCH WILL IT COST TO FILL A FUEL CELL CAR'S TANK?

A. Today the cost is comparable to that of filling a petrol car's tank.

## Q ARE FUEL CELL CARS COMPLICATED TO DRIVE?

A. No, a fuel cell car such as Mirai is as easy to drive as any other car. Mirai's incredibly quiet and smooth drive combined with responsive power and intuitive controls, means it's a rewarding companion in all driving environments.

## Q IS IT TRUE THAT FUEL CELL CARS DON'T WORK IN COLD CONDITIONS?

A This used to be true of earlier fuel cell systems, but a next generation car such as Mirai can start and operate normally in temperatures as low as -30°C.

## Q ARE FUEL CELLS BETTER FOR THE ENVIRONMENT?

A Yes, because they emit no harmful gases or other pollutants whilst driving (like CO<sub>2</sub>, NO<sub>x</sub>, HC and particulates) and only water is discharged from the tailpipe. Hydrogen can also be supplied from entirely renewable sources.

## Q WHERE DOES THE HYDROGEN COME FROM?

A. Hydrogen is the most abundant element in the universe and is found in nearly everything. But it also binds to almost anything, so before we can use it we have to separate it from other substrates including biomass, natural gas or water (by electrolysis). Hydrogen can be produced by the energy generated by wind, solar or hydro sources. This variety of origins provides us with a source of energy diversity and security.

## Q IS HYDROGEN SAFE TO USE?

A While hydrogen should be handled carefully, millions of tonnes are already safely used in industry every week. The gas is light and disperses in the open air quickly. The Mirai's fuel system has been

engineered to minimize the chance of a leak. However, should it happen, there are systems in place to detect the leak and shut off the flow of hydrogen as well as preventing leaks from accumulating.

## Q WHERE CAN I REFUEL?

A Dedicated fuel stations are being built in conjunction with the vehicle roll-out in a combination of standalone and forecourt sites. The stations are being clustered to ensure customers have a good back-up and easy regional access suiting the 300-mile range. The first areas covered are: London (5 stations), Swindon, Sheffield and Aberdeen. The first Shell station opened at Cobham services with 2 more planned later in 2017.

## Q CAN I BUY A MIRAI?

A Production is limited, and although vehicles can only be introduced where fuelling infrastructure exists, demand is higher than supply. We will therefore work with prospective owners to assess the suitability of the vehicle for them. Interest for the vehicle can be registered at [www.toyota.co.uk/mirai](http://www.toyota.co.uk/mirai) and we will contact you to discuss requirements.

# FUEL CELL SAFETY

For over 20 years we've been testing our fuel cell technology to ensure it meets Toyota's very strict safety standards; only then could we be sure it's as reliable as the technology in every other Toyota. Now, after covering millions of miles in some of the world's harshest environments, passing the strict crash and fuel tank tests and thousands of refuelling tests, we are ready for our fuel cell story to begin.

From the incredible strength of the carbon fibre hydrogen tanks and carbon fibre reinforced plastic fuel cell stack frame, to the impact-absorbing safety structure and intelligent hydrogen monitoring sensors – safety is such an important part of the Mirai that it sets new standards.

In addition, the Mirai comes equipped with a range of leading active and passive safety systems including: Pre-Collision System, Rear Cross Traffic Alert, Blind Spot Monitor (BSM), eight airbags and extensive pedestrian impact-absorbing body panels.







## EXPERIENCE QUIET DRIVING FROM A PREMIUM POSITION

**Step inside the Mirai. The futuristic cabin effortlessly combines comfort and convenience with innovative technology, lasting quality and everyday practicality.**

**Navigation, audio and multimedia features are handled by the impressive 7" Toyota Touch® 2 screen, incorporating Go Plus navigation and premium 11-speaker JBL sound. Located high up on the dashboard – at an easy glance from the heated leather steering wheel – are the comprehensive four-zone information meters. These provide the driver with clear shift status, warning light indicators and two 4.2" colour TFT screens with a range of configurable displays from speed and power meters, to audio and navigation instructions.**

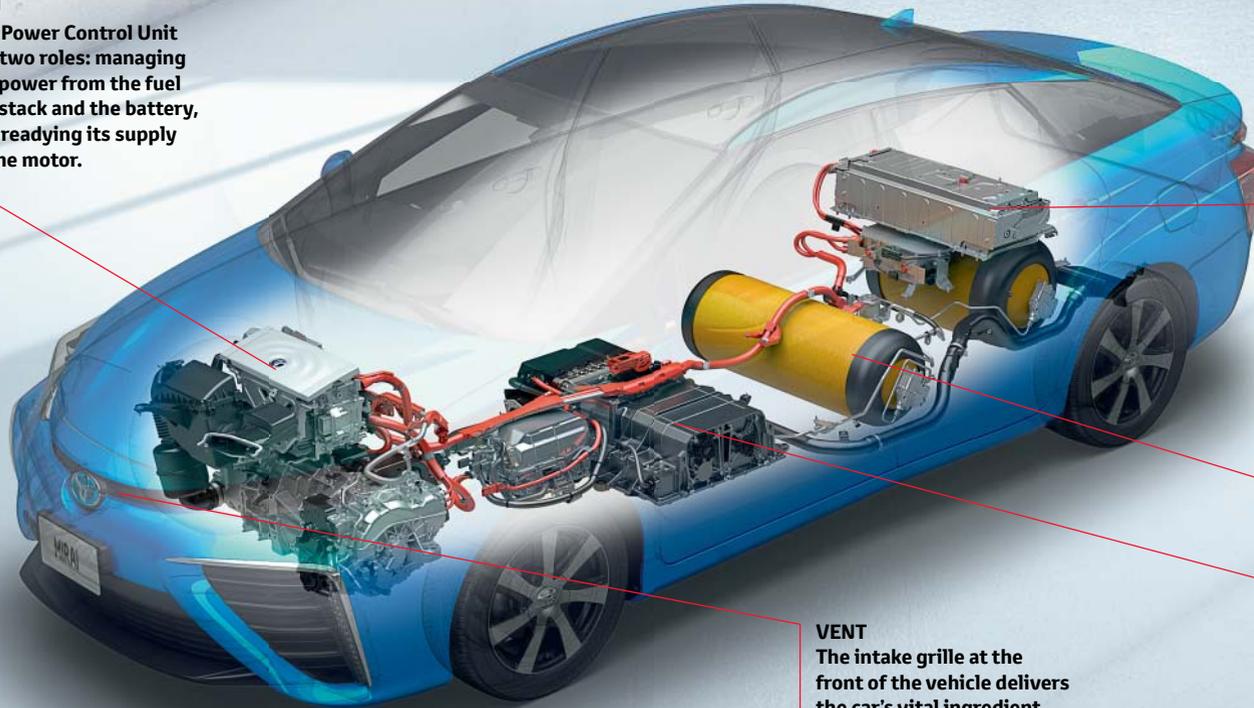
**Four adults are able to relax in a quiet interior offering wide heated seats and a high-tech cabin with flowing curves, rich carbon details and a practical boot space. A wireless phone charger tray, and a 4.2" air control display with electrostatic switches – that let you adjust the cabin's temperature at the slide or touch of a finger – finish off an unmistakably high-tech interior.**

# A FUTURE WITH HYDROGEN MADE POSSIBLE BY HYBRID

With decades of hybrid technology expertise behind us, we've built the perfect platform with which to develop proprietary technologies, such as the fuel cell stack. We know we can't start an alternative fuel revolution on our own though, so we've made over 5,000 fuel cell patents available for other carmakers and industries to use, royalty-free.

## PCU

The Power Control Unit has two roles: managing the power from the fuel cell stack and the battery, and readying its supply to the motor.



## BATTERY

The Mirai's nickel-metal hydride battery stores the energy that is recovered while decelerating, and also assists the fuel cell stack when you need more power during acceleration.

## TANKS

Two high-pressure carbon fibre tanks store the hydrogen as fuel. These lightweight tanks feature a world-leading power density and are capable of withstanding incredibly high forces.

## VENT

The intake grille at the front of the vehicle delivers the car's vital ingredient, air, to the Mirai's fuel cell stack.

## FC STACK

The Toyota fuel cell stack features a compact size and a world-leading power output for responsive performance.

# SPECIFICATIONS

## ELECTRIC MOTOR

Maximum power output (DIN hp)	154
Maximum power output (kW)	113
Maximum torque (Nm)	335

## PERFORMANCE

Maximum speed (mph)	111
0–62 mph (secs)	9.6
Cruising range (miles)*	up to 342
Drag coefficient	0.29

## HYBRID BATTERY

Number of cells	34
Capacity (Ah)	6.5

## FUEL CELL STACK

Volume power density <sup>§</sup>	3.1 kW/l
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## HIGH-PRESSURE HYDROGEN TANKS

Number of tanks	2
Fuel tank capacity (litres)	122.4 (front 60.0 / rear 62.4)
Hydrogen storage mass (kg)	approx. 5.0
Nominal working pressure	70 MPa (700 bar)
Tank storage density <sup>°</sup>	5.7 wt %

## SUSPENSION

Front	MacPherson strut
Rear	Torsion beam

## BRAKES

Front	Ventilated disc
Rear	Solid disc

## LOAD CAPACITY

Luggage capacity (litres)	361
Luggage room length (mm)	728
Luggage room maximum width (mm)	1612
Luggage room height (mm)	554

## DIMENSIONS & WEIGHTS

Exterior length (mm)	4890
Exterior width (mm)	1815
Exterior height (mm)	1535
Front tread (mm)	1535
Rear tread (mm)	1545
Front overhang (mm)	1075
Rear overhang (mm)	1035
Wheelbase (mm)	2780
Ground clearance (mm)	130
Interior length (mm)	2040
Interior width (mm)	1465
Interior height (mm)	1185
Number of seats	4
Gross vehicle weight (kg)	2180
Kerb weight (kg)	1850

\* Estimated, according to NEDC Cycle. As measured by Toyota when refuelling at a hydrogen station supplying hydrogen at a pressure of 70 MPa under SAE J2601 standards (ambient temperature: 20°C; hydrogen tank pressure when fuelled: 10 MPa). Differing amounts of hydrogen will be supplied to the tank if refuelling is carried out at hydrogen stations with differing specifications, and the cruising range will therefore also differ accordingly. Possible cruising range may vary due to usage conditions (weather, traffic congestion, etc.), vehicle weight and driving methods (quick starts, air conditioning, etc.). Refuelling stations must comply with SAE J2601 and vehicles must be refuelled at 70 MPa.

<sup>§</sup> As of November 2014, Toyota data.

<sup>°</sup> Hydrogen storage mass per tank weight.



VISIT OUR WEBSITE  
[TOYOTA.CO.UK/MIRAI](http://TOYOTA.CO.UK/MIRAI)

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THE ONLY TAILPIPE EMISSION FROM MIRAI IS WATER

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