FCV The Vehicle that will Lead the Way to a Hydrogen-Based Society

Fuel Cell Vehicles (FCVs) are cars powered by a fuel cell, which generates electricity from a chemical reaction between hydrogen and oxygen in the atmosphere. When operating, the vehicle only emits water, and there are no emissions of carbon dioxide or substances of environmental concern. Hydrogen is a leading energy for the future that is expected to lead to solutions to environmental and energy problems.
Toyota has been developing FCVs for more than 20 years in order to make a contribution to the development of a hydrogen-based society where hydrogen is widely used. In December 2014, Toyota began market sales of the MIRAI, making significant first steps towards achieving the world and car of 100 years in the future.

Advantages of FCV

Energy Diversification

- Hydrogen can be produced from various primary sources

Zero Emission

- Zero CO_2 Emissions during operation

Driving Pleasure

- Motor driven smooth and silent operation
- Powerful acceleration from startup to low and medium speeds

Performance

- Cruising range: Equivalent to gasoline-powered cars
- Refuelling time: Approx. 3 minutes
- Cold start capability: -30°C

Power-supply for Emergencies

- Electricity generated by onboard fuel-cells can be supplied for household use or used for electric appliances on board
- Large Power Supply

MIRAI

TFCS: Toyota Fuel Cell System

The MIRAI uses the Toyota Fuel Cell System (TFCS) which integrates Toyota's accumulated hybrid and fuel cell technologies. Two energy sources - a FC stack and drive batteries - are optimally used to power the motor in differing situations, achieving powerful and highly efficient driving.

Fuel Cell Stack

Toyota's first mass-production fuel cell, featuring a compact size and world top level output density.

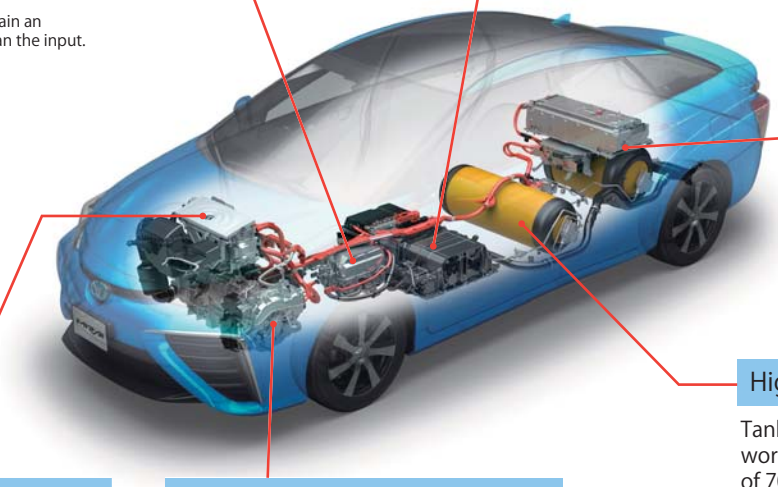
Volume power density: 3.1 kW/L **World's Highest Level*1**

Maximum output: 114 kW (155 PS)

Fuel Cell boost converter

A compact, high-efficiency, high-capacity converter newly developed to boost fuel cell stack voltage to 650 V.

A boost converter is used to obtain an output with a higher voltage than the input.



Battery

A nickel-metal hydride battery which stores energy recovered from deceleration and assists fuel cell stack output during acceleration.

High-pressure hydrogen tank

Tank storing hydrogen as fuel. The nominal working pressure is a high-pressure level of 70 MPa (approx. 700 bar). The compact, lightweight tanks feature world's top level storage density.

Tank storage density: 5.7 wt % *2

World's Highest Level*1

Power Control Unit

A mechanism to optimally control both fuel cell stack output under various operational conditions and drive battery charging & discharging.

Motor

Motor driven by electricity generated by fuel cell stack and supplied by battery.

Maximum output: 113 kW (154 PS)

Maximum torque: 335 N-m (34.2 kgf-m)

*1 As of November 2014; according to Toyota
*2 Ratio of Hydrogen storage (mass) to tank mass