



Hyundai Motor America
 10550 Talbert Ave, Fountain Valley, CA 92708
 MEDIA WEBSITE: HyundaiNews.com
 CORPORATE WEBSITE: HyundaiUSA.com

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HYUNDAI MOTOR IX35 FUEL CELL



Andreas Brozat
 Head of PR & BTL
 +49 69 271 472 412
 abrozat@hyundai-europe.com

ID: 38930

- **Hyundai Motor first automaker to begin assembly-line production of fuel cell vehicle**
- **Hydrogen-powered ix35 Fuel Cell can travel 594 km on a single tank**
- **Winner of prestigious FuturAuto 2013 award for technical innovation**

Offenbach, 10 September 2013 - Production of the Hyundai Motor ix35 Fuel Cell began at the company's Ulsan manufacturing plant in Korea in January 2013, making Hyundai Motor the first automaker to begin commercial production of a hydrogen-powered vehicle. The first complete car rolled off the assembly line on 26 February 2013.

Hyundai Motor has already signed contracts to lease the ix35 Fuel Cell to municipal fleets in Scandinavian countries and the first 15 cars were delivered to the City of Copenhagen on 3 June. Additionally, since October 2011, the EU Fuel Cells and Hydrogen Joint Undertaking (FCH JU) in Brussels has been providing Hyundai Motor ix35 Fuel Cell vehicles to EU policy makers and the public in order to demonstrate the market readiness of fuel cell technology.

Award-winning credentials

At the 2013 European Motor Show in Brussels, Belgium, the Hyundai Motor ix35 Fuel Cell was awarded the prestigious FuturAuto accolade, selected as winner for becoming the first mass-produced, hydrogen-powered fuel cell vehicle to be commercially available.

The award, in its 12th year, celebrates technological innovation in the automotive industry and is judged by a respected panel of journalists from the Belgian Automotive Press Union (UJBA).

From a long list of 16 candidates, the judges selected a five-strong shortlist which included innovations from Hyundai Motor, Bosch, Mazda, Mercedes Benz and Volvo.

Third-generation FCEV

The ix35 Fuel Cell is the third-generation fuel cell-powered electric vehicle (FCEV) from Hyundai Motor. Since it began researching and developing fuel cells in 1998, Hyundai Motor has become a world leader in the development of hydrogen fuel cell technology, and operates the largest fuel-cell research centre in Korea.

In 2005, the Tucson FCEV was introduced, powered by the company's first 80 kW (109 ps) fuel cell.

The latest generation of Hyundai Motor's FCEV family, the ix35 Fuel Cell represents a truly viable everyday vehicle, retaining the safety, equipment, convenience and performance of the conventionally powered ix35 and producing zero harmful tailpipe emissions.

The ix35 Fuel Cell delivers large improvements over its predecessor, including a driving range that has been extended by more than 50% and fuel efficiency gains of more than 15%.

The ix35 Fuel Cell is equipped with a 100 kW (136 ps) electric motor, allowing it to reach a maximum speed of 160 km/h. Two hydrogen storage tanks, with a total capacity of 5,64 kg, enable the vehicle to travel a total of 594 km on a single charge, and it

can reliably start in temperatures as low as minus 20 degrees Celsius. The energy is stored in a 24 kWh lithium-ion polymer battery, jointly developed with LG Chemical.

Fuel cells operate by turning chemical energy from hydrogen into electromechanical energy. Internal to a fuel cell, an anode and cathode sandwich a polymer electrolyte membrane. The process of creating an electrical current occurs in three stages:

- Hydrogen gas flows over the anode, causing it to split into hydrogen ions (protons) and electrons.
- The polymer electrolyte membrane only allows the protons to pass through. The electrons travel to an external circuit which operate the motor.
- At the cathode, electrons and protons react with oxygen (from air) creating H₂O – water – which flows out of the cell as the only waste product.

Hyundai Motor's ix35 Fuel Cell represents one of the most advanced vehicles of this type, and with continued development and improvements in production costs, it is expected that limited mass production will enable sales to much greater numbers of customers around the world to start beyond 2015.

Hyundai Motor's hydrogen initiatives

Hyundai Motor has been involved in a wide range of initiatives and partnerships to help promote hydrogen fuel cells as a future solution to Europe's transport requirements. With governments, non-profit organisations and private ventures all looking to the alternative modes of transport, Hyundai Motor is supporting the momentum surrounding FCEVs across the region.

In May 2011, Hyundai Motor signed a memorandum of understanding (MOU) with the City of Copenhagen, fuel cell producer H2 Logic and Hydrogen Link – the latter an association working to advance the use of electricity for transportation in Denmark based on hydrogen and fuel cells.

The aim of the agreement is to establish an infrastructure for the support of FCEVs in Copenhagen, a city which aims to be carbon neutral by 2025. Under the MOU, Hyundai Motor provided two ix35 Fuel Cell vehicles for a test drive attended by mayors of the capital cities of Denmark, Norway, Sweden and Iceland in 2011.

In October 2011, Hyundai Motor invited Europe's top media to test its ix35 Fuel Cell in Copenhagen, and, in doing so, took another significant step towards its goal of bringing FCEVs to the mainstream car market by 2015.

The Copenhagen test drive followed the news that the ix35 Fuel Cell had been selected by the European Commission-backed 'Fuel Cells and Hydrogen Joint Undertaking' (FCH JU) to be used as a demonstration vehicle to test and promote hydrogen fuel cell technology in a real-world environment. As part of the initiative, the ix35 Fuel Cell was made available for Members of the European Parliament, Commissioners, EU officials and other policy makers to test drive. This gained great visibility for the ix35 Fuel Cell and hydrogen vehicle technology among policy makers.

In January 2012, Hyundai Motor signed a memorandum of understanding along with twelve other industry participants to launch a scheme called UKH2Mobility. This draws on the experience of other hydrogen initiatives from across Europe to investigate the potential for hydrogen as a fuel for ultra-low carbon vehicles. Calling on £400 million (approximately €475 million) of funding from the UK government, the results of the scheme will lead to further steps to introduce hydrogen as a more mainstream fuel in the UK.

A February 2013 study published by UKH2Mobility forecast that, with suitable infrastructure investment, more than 1,5 million hydrogen-powered vehicles could be on the roads by 2030 in the UK alone.

The company's vision and strategy has earned it recognition as one of the 'Top Global Green Brands of 2012' in Interbrand's 50 Global Green Brands report. Placed 17th overall, Hyundai Motor was one of the highest-ranked automakers. Interbrand made particular mention of Hyundai Motor's industry leadership in zero-emissions technology through advances in hydrogen fuel-cell development.

Through technological development, as well as the various schemes and initiatives that Hyundai Motor is involved in, the company is demonstrating its commitment to hydrogen fuel cell vehicles as an environmentally friendly solution for fulfilling future mobility needs.

Technical specifications

Hyundai Motor ix35 Fuel Cell

Powertrain and transmission

Front-mounted induction motor with two mid-mounted hydrogen fuel cell storage tanks.
Battery - 24 kWh lithium polymer
Fuel cell - 100 kW fuel cell with two hydrogen storage tanks
Power / torque - 100 kW (136 ps) / 300 Nm available from zero rpm
Transmission - Gear differential unit
Emissions - H₂O (water) only

Suspension and damping

Front - Fully independent – subframe-mounted MacPherson struts, with coil springs and gas-filled shock absorbers. Anti-roll stabiliser bar.
Rear - Fully independent – subframe-mounted multi-links, coil springs and gas-filled ASD shock absorbers.

Steering

Type - Electric power-assisted rack and pinion
Overall ratio - 15,9:1
Gearing - 2,96 turns lock-to-lock
Turning circle - 10,58 metres

Brakes

Power - Servo-assisted, electronically-controlled
Front - Ventilated discs; 300 mm
Rear - Solid discs; 262 mm
Parking brake - Hand-operated lever
ABS - 4-channel anti-lock system with EBD
BAS - Boosts braking power during emergency stops
DBC - Downhill Brake Control maintains 8 km/h speed during descents 100-to-0 km/h 41,7 metres

Wheels and tyres

Wheels - Alloy 16 x 6,5 inch
Tyres - 215/70 R16
Spare - Tyre mobility kit

Dimensions (mm)

Exterior

Overall length - 4410
Overall width - 1820 (excluding door mirrors)
Overall height - 1670
Wheelbase - 2640
Front track - 1585
Rear track - 1586
Front overhang - 880
Rear overhang - 890
Ground clearance - 170
Approach angle - 24,2 degrees
Departure angle - 26,9 degrees
Ramp over angle - 17,0 degrees
Roll over angle - 45,0 degrees
Max. climb angle - 44,19 degrees

Interior

Front Rear
Headroom 1000 994
Legroom 1047 982
Shoulder room 1450 1400
Hip room 1410 1356

Weight (kg)

Kerb weight - 1830
Gross weight - 1980
Payload - 375

Capacities

Hydrogen storage tank - 5,64 kg / 700 bar (70 MPa)
Luggage - 465 – 1436 litres

Performance*

Top speed (km/h) - 160
0-to-100 km/h (sec) - 12,5

Economy*

Driving range - 594 km
kg / 100 km (hydrogen) - 0,95

* Figures stated are manufacturer's estimates

About Hyundai Motor

Established in 1967, Hyundai Motor Co. has grown into the Hyundai Motor Group, with more than two dozen auto-related subsidiaries and affiliates. Hyundai Motor - which has seven manufacturing bases outside of South Korea including Brazil, China, the Czech Republic, India, Russia, Turkey and the U.S. - sold 4,4 million vehicles globally in 2012. Hyundai Motor, which employs approximately 100.000 worldwide, offers a full line-up of products including small to large passenger vehicles, SUVs and commercial vehicles.

Further information about Hyundai Motor and its products is available at <http://www.hyundai.com/>.

About Hyundai Motor Europe

The company designs, engineers and manufactures cars in Europe, specifically for European consumers. In 2012, Hyundai Motor achieved European sales of 444.000 units, taking a new-car market share of 3,5%. Almost 95% of the vehicles Hyundai Motor sells in the region are designed, engineered and tested in Europe. And more than 70% are built at its two local factories (Czech Republic and Turkey), including New Generation i30, which was shortlisted for Europe's 2013 Car of the Year award and has won 14 awards throughout the region. Hyundai Motor sells cars in 28 European countries across 2.500 outlets.

Hyundai Motor offers its unique, Europe-only, Five Year Unlimited Mileage Warranty package with all new cars sold in the region, providing customers with a five-year warranty with no mileage limit, five years of roadside assistance and five years of vehicle health checks.

More information about Hyundai Motor Europe and its products is available at <http://www.hyundai.com/eu>.