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First UK visit for the remarkable A-Class 'F-Cell'

Mercedes-Benz The A-Class F-Cell makes it's first visit to London MB1541/S
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· Mercedes-Benz A-Class F-Cell vehicle to visit London
· DaimlerChrysler supporting the ninth Grove Fuel Cell Symposium
· F-Cell technology part of the company's "Energy for the Future" initiative

The Mercedes-Benz A-Class F-Cell, powered by fuel cell technology, will be on display in London from 3-6 October, as part of the Grove Fuel Cell Symposium. It is the first time that DaimlerChrysler has shown the latest achievements in fuel cell technology in the UK.

Fuel cell symposium
The car will form part of a future technology display in Trafalgar Square on Monday 3 October, alongside other exhibits. On the following three days it will offer guests and delegates to the symposium (at the Queen Elizabeth II Centre, Westminster) a chance to experience fuel cells first hand, with passenger rides around central London.
DaimlerChrysler currently has the world's largest fleet of fuel cell vehicles in everyday use around the world - 100 - all of which meet zero-emission requirements. No other motor manufacturer has as many vehicles with fuel cell drive in operation. Since 2003, 30 Mercedes fuel cell buses have been operating in the public transport systems of 10 European cities. Almost one million kilometres have been driven in over 80,000 hours of operation, and more than two million passengers have been transported. Three buses have been in use in London since January 2004, one of which is also on display as part of the Grove Fuel Symposium.
Mercedes-Benz first introduced its fuel cell vision back in 1994, with the NECAR 1. The fuel cell equipment weighed 800 kilograms, and took up the entire load space of a panel van. Now, several generations later, the fuel cell fits in to the car's sandwich floor - leaving interior space and comfort unchanged.

Fuel cell-powered powertrains are often seen as a viable future propulsion system. They run on hydrogen - the lightest chemical element and one that makes up some 90 per cent of all matter in the universe. Regeneratively-produced gaseous hydrogen - the kind used in the A-Class 'F-Cell' - is environmentally friendly, emits only steam and cannot produce carbon dioxide.

How fuel cells work

The fuel cell gets its energy from the reaction of its fuel (hydrogen) mixing with oxygen. A highly efficient process, the only waste product generated is pure water (H2O). The main way in which a fuel cell works is thanks to its most important element - the proton exchange membrane, which separates two graphite plates. Atmospheric oxygen is provided to one side of the membrane, with electrically-charged hydrogen on the other. This hydrogen can penetrate the membrane as a proton (an atomic particle). It then undergoes a controlled chemical reaction with the oxygen (forming water). This reaction creates electrical energy that provides propulsion.

Although it sounds - and indeed is - a very precise science, the engineers at Mercedes-Benz have developed a system that is robust enough to be used every day. In fact, 60 customers in Germany, Japan, Singapore and the USA have been running A-Class 'F-Cells' since the end of 2002. The results from these practical tests are constantly being fed into the ongoing F-Cell work.

Fuel consumption has been dramatically improved; and the F-Cell covered 5,190 miles in a round-the-clock endurance drive without missing a beat. The cold starting issues normally associated with the technology have been addressed, with the new vehicles able to operate in temperatures as cold as -20° C.

Wilfried Steffen, President and CEO of DaimlerChrysler UK, explained the company's commitment to alternative power systems: "Fuel cells are widely regarded as the long-term goal for zero-emission vehicles, but DaimlerChrysler is working on a number of alternative systems that could appear much sooner.

"Our engineers are working on a number of hybrid drive systems; also engines with stop and go technology; while some of our cars can run on environmentally-friendly biodiesel. Even today a customer can walk into a showroom and order a clean Mercedes-Benz diesel engine. All models meet or exceed Euro IV requirements, and deliver refined, powerful and frugal motoring."

Mr Steffen concluded: "Energy for the Future isn't just a fantasy - at DaimlerChrysler we are already a long way along the journey to delivering some of the world's cleanest cars."

Five steps to sustainable mobility

All these technological advances are part of DaimlerChrysler's five step plan for a sustainable automotive future:

1. Optimisation of petrol and diesel engines.
2. Improvements to conventional fuels.
3. Use of CO2-neutral BTL fuels.
4. Further development of hybrid drives as an interim solution...
5. ...towards emission-free mobility with fuel cell vehicles.

NOTES

DaimlerChrysler is at the forefront of research and development. It spends around €Euros 15 million per day on R&D. Some of this money has helped to develop the following technologies:

Hybrids
DaimlerChrysler AG , General Motors and BMW are working together to pool their expertise for the accelerated and efficient development of hybrid drive systems. At the beginning of September, the three global manufacturers signed a 'memorandum of understanding' governing the formation of an alliance of equals for the joint development of hybrid drive systems. The new 'GM, DaimlerChrysler and BMW Hybrid Development Center', located in Troy, Michigan, in the US, will develop the overall modular system and the individual components: electric motors, high-performance electronics, wiring, safety systems, energy management, and hybrid system control units. In addition, the Hybrid Development Center will be responsible for system integration and project management.

At September's Frankfurt motor show, Mercedes-Benz unveiled two new Vision cars: 'DIRECT HYBRID' and 'BLUETEC HYBRID': Petrol cars - as efficient as diesels; diesel cars - as clean as petrol cars.

Using the new S-Class as an example, the company is exhibiting unique designs for yet again markedly improving fuel consumption and emissions in the near future - while preserving high dynamic ride comfort. The focus is on combining optimised petrol and diesel engines.

For the petrol engine car, the main emphasis is on reducing fuel consumption even further. With the second-generation spray-guided petrol direct injection system, the engineers at Mercedes-Benz have achieved a crucial innovation that allows considerable fuel savings. Using the current 3.5-litre V6 as the basis, this technology was implemented under the bonnet of the new S-Class. This vehicle, which incorporates a compact, high-torque electric motor, is the 'DIRECT HYBRID'.

The goal of achieving the lowest possible emissions has been implemented commendably by the 'BLUETEC HYBRID' concept car based on the new 3-litre V6 diesel in the new S-Class - and also incorporating a high-torque electric motor. The crucial element in the success of this system is 'BLUETEC', a new exhaust gas purification technology that reduces the nitrogen oxides by about 80 per cent through selective catalytic reduction (SCR). This technology makes the 'BLUETEC HYBRID' the cleanest diesel in the world.

Both of the drive systems in the concept cars introduced in Frankfurt are combined with an electric motor integrated in the drive train, thereby becoming what are called 'mild hybrids'. This makes it possible to once more significantly reduce the already excellent fuel consumption of the optimised combustion engine, especially in urban stop-and-go traffic.

The combustion engine switches off whenever it is not needed. At other times, the combination of combustion engine and high-torque electric motor act in concert to ensure a powerful and silky-smooth start when pulling away. Moreover, the electric motor reclaims energy during coasting and braking. These combined features allow a 20 per cent reduction in fuel consumption in the 'BLUETEC HYBRID' relative to the comparable predecessor model, and as much as a 25 per cent reduction in the 'DIRECT HYBRID'.

The NECAR family - a journey through the history of fuel cell drive
In 1994, the DaimlerChrysler engineers started to sound out the opportunities presented by this technology, with the introduction of several concept vehicles. It is above all with the models from the 'NECAR' series that DaimlerChrysler has made this technology familiar to the general public.

1994: NECAR 1 The first New Electric Car, named NECAR 1, demonstrated the fundamental feasibility of the hydrogen-based mobile fuel cell. The apparatus, weighing 800 kilograms, takes up the entire load space of this Mercedes-Benz van; there is only sufficient room left for the driver and a front-seat passenger - this vehicle is a laboratory on wheels.

1996: NECAR 2, the successor vehicle with a fuel cell system drastically reduced in size, was already a car suitable for everyday operation - a Mercedes-Benz V-Class with a range of 250 km (155 miles) and a top speed of 110 km/h (68 mph).

1997: NECAR 3 is a Mercedes-Benz A-Class car powered by the fuel cell. The most significant features of this model are the further reduction in size of its power system and the fact that the hydrogen is produced directly on board. Instead of carrying around this element in bulky pressure cylinders, NECAR 3 derives the hydrogen while on the move from methanol, a liquid fuel. In a so-called reformer, the methanol is transformed by the addition of water into a gaseous mixture rich in hydrogen, with a relatively low carbon dioxide content.

1997: NEBUS With NEBUS (New Electric Bus), DaimlerChrysler presented the first city bus to feature fuel cell drive. NEBUS has a range of 250 km (155 miles), a top speed of 80 km/h (50 mph) and a power rating of 250 kW.

1999: NECAR 4 With NECAR 4, the DaimlerChrysler engineers first succeeded in stowing the entire compact fuel cell drive system, with an output of 70 kW, in the sandwich floor unit of the Mercedes-Benz A-Class. This car, which runs on liquid hydrogen, attains a top speed of 145 km/h (90 mph) and has an operating range of 450 km (280 miles). A uniform catalytic coating on the proton exchange membrane is crucial to the generation of electricity in this fuel cell car. The engineers devised a new method of applying the catalytic noble-metal coating much more evenly, thereby increasing the energy yield over the entire surface of the unit. A further advantage of this improved process is that only half the quantity of the precious metal is required; this reduces the costs of the catalytic unit.

2000: NECAR 5 operates on the basis of methanol as a hydrogen storage medium. In 2002, this car set an endurance record for fuel cell vehicles: it covered the 5,250 km (3,260 miles) from San Francisco to Washington, crossing the Sierra Nevada and the Rocky Mountains in the process. It surmounted altitudes of up to 2,640 m (8,860 ft) in addition to negotiating bumper-to-bumper traffic in major cities.

2000: Jeep Commander 2 The Jeep Commander 2 is a sport utility vehicle (SUV) from the luxury category. The Jeep's tank is filled with methanol, from which the hydrogen is reformed directly on board. The fuel cell stack of the Commander develops 50 kW at a voltage of 250 V. The axles are driven by two electric motors, and the system is supported by a 40 kW battery.

2001: Hermes Sprinter In 2001, DaimlerChrysler established a joint venture with the Hamburg forwarding company Hermes Versand Service, in order to test the fuel cell-powered Mercedes-Benz Sprinter van in everyday service with a customer. This vehicle runs on gaseous hydrogen and has a range of 150 km (93 miles). Its 55 kW electric motor makes for a top speed of 120 km/h (75 mph). In its first year of operation, the fuel cell Sprinter covered more than 16,000 km (10,000 miles) in all four seasons, delivering goods to 4,200 customers in the process.

2001: Natrium The Chrysler 'Natrium' Town & Country Minivan runs on sodium borohydride (NaBH4), a salt with a high hydrogen content. A catalyst releases the hydrogen, which supplies the energy for the fuel cell. This vehicle has an operating range of 500 km (310 miles), accelerates from 0 to 100 km/h (62.1 mph) in 16 seconds and reaches a top speed of 130 km/h (80 mph). 'Natrium' is the German and Latin word for sodium.

2002: Mercedes-Benz A-Class 'F-Cell' The world's first small-series automobile with fuel cell drive was launched under the name 'F-Cell' - with customers in Europe, the USA, Japan and Singapore. The entire fuel cell system of the 'F-Cell' is located within the sandwich floor unit of the long-wheelbase Mercedes-Benz A-Class car. The further development of fuel cell technology is now being pursued above all in everyday operation and in large-scale field tests.

2003: Mercedes-Benz Citaro The Mercedes-Benz Citaro is the successor to NEBUS. The fuel cell system, developing more than 200 kW, and the pressurized gas cylinders are located on the roof. The bus can accommodate
70 passengers and has an operating range of 200 km (125 miles); its top speed is 80 km/h (50 mph). A fleet of thirty of these buses has been in operation in ten major European cities since 2003. These were joined in 2004 by three buses in Perth (Australia), and another three are to follow in the course of this year in Peking.

2004: Dodge Sprinter A Dodge Sprinter will be North America's first fuel cell commerical vehicle to be used in delivery operation. The Sprinter is fueled by
gaseous hydrogen and has a range of around 250 km (155 miles). Its electric motor develops 85 kW and a torque of 230 Nm. The braking energy can be recovered.

2005: Mercedes-Benz B-Class 'F-Cell' At the Geneva Motor Show, DaimlerChrysler celebrated the world premiere of fuel cell drive in the
B-Class. The Group thus extended its family of zero-emission vehicles to include the category of sports tourers.

SunDiesel

Synthetic biofuels represent an innovative and environmentally-friendly solution to alternative power sources. Using biomass to liquid (BTL) technology, where any kind of organic or biomass residual material is used to produce the fuel, annual European carbon dioxide emissions could be reduced by 200 million tons.

SunDiesel can be used to power diesel cars already on the road, and it's CO2-neutral: during the combustion process the amount of CO2 generated is the equivalent of that which the plants [from which SunDiesel is derived] absorbed during their life.

BTL fuels reduce CO2 emissions by around 90 per cent compared with traditional diesel engines. To produce BTL, the biomass uses energy stored within the biomass and is some 40 per cent better than traditional biofuels derived from rapeseed (rapeseed methyl ester - RME - fuel).