

FUEL CELL BUSES



CLEAN AND QUIET
BUS LINE



In the HyFLEET:CUTE project, Daimler engineers are working on the second-generation fuel cell bus

Like its predecessor, it will be completely emission-free and very quiet. It will also use the energy it consumes more efficiently. This is how Daimler researcher Monika Kentzler sums up the key advantages associated with the next generation of the Citaro fuel cell bus.

As part of the HyFLEET:CUTE EU project, the new urban bus is currently being built at the Research and Development Center for Fuel Cells in Nabern, Germany, which is managed by Christian Mohrdieck. The project, which was launched in January 2006 and is scheduled to run until September 2009, is expected to cost around €43 million. It is a continuation of two earlier EU projects in which 30 Mercedes-Benz hydrogen-powered fuel cell buses were tested for two years in regular daily service in ten European cities.

Building on this rich store of experience, HyFLEET:CUTE will now go on testing these fuel cell buses and the existing hydrogen filling stations on a continuous basis in order to assess the fuel cell stack's long-term durability. Altogether, 33 Citaro fuel cell buses are currently being put through their paces in nine cities around the world – in Amsterdam, Barcelona, Hamburg, London, Luxembourg, Madrid, Reykjavik, Beijing, and Perth. The alternative bus fleet has so far put in more than 127,000 hours of service and successfully traveled approximately 1.9 million kilometers.

Lithium-ion battery The main aim of the EU project, which is being coordinated by Monika Kentzler, is to develop the next generation of hydrogen fuel cell buses. The prototype that the engineer and her colleagues from Daimler Research are putting together in Nabern will differ from the Citaro buses of the current test fleet in some crucial areas.

For example, each of the two rear wheels is equipped with a wheel-hub motor to drive the 12-meter-long urban bus quietly and without

producing pollutant emissions. Back in 1997, Daimler engineers were already using this design successfully in the NEBUS, the first bus in the world with a fuel cell drive.

The new bus will be equipped with a lithium-ion high-voltage battery that serves as an extra medium for energy storage in addition to the hydrogen tanks. The battery can meet the peaks in demand on the electric motor that arise when the driver starts up the bus on a hillside or accelerates rapidly. It also helps save energy: during downhill driving and braking, the electric motor acts as a generator that charges the battery.

Weight reduction Accessory units such as the power-steering pump or the compressors for the air-conditioning and compressed air systems are now operated electrically rather than mechanically. Overall, this reduces the weight of the vehicle by several hundred kilograms, which improves fuel consumption.

“Thanks to this package of innovations, the energy consumed by the new Citaro fuel cell bus is used ten to twenty percent more efficiently than was the case in its predecessor,” says Kentzler. Starting in mid-2009, she and her colleagues plan to show this second-generation demonstration model in three major European cities.

To ensure that they can do so, Jürgen Friedrich's department at the Research and Development Center for Fuel Cells in Nabern has built a test rig on which individual components of the alternative drive system are tested and optimized. The entire system is subsequently installed in a vehicle bodyshell from the bus plant in Mannheim.

The next steps will be the initial road tests and test drives, followed ultimately by authorization for road use. If everything goes according to plan, the new Citaro will almost certainly become just as popular as its predecessor. ::



B-CLASS F-CELL



Time to hit the road

In the summer of 2010, Mercedes-Benz will celebrate the market launch of the first series-produced car with a fuel cell drive: the B-Class F-Cell.

A newly designed fuel cell system will act as the innovative car's drive system. It is based on modules that Daimler introduced in its F 600 HYGENIUS research car in 2005.

The vehicle's fuel cell stack is 40 percent smaller, generates 30 percent more output, and uses 16 percent less fuel than the predecessor generation in the A-Class F-Cell. In addition, the B-Class F-Cell boasts outstanding cold-start performance.

Thanks to an even more compact and powerful system, the B-Class F-Cell's range is twice that of the drive system of the current A-Class F-Cell. The electric motor has a peak output of 100 kW/136 hp and a maximum torque of 320 Nm – yet the emission-free fuel cell drive of this family-friendly compact car consumes the energy equivalent of only 2.9 liters of diesel fuel per 100 kilometers.