

Press Release

World Technology First:

Significant Participation of Proton Motor in the development of the first fuel-cell-powered street cleaning vehicle

Basle / Puchheim, July 15th 2009 – Proton Motor Fuel Cell GmbH, the experts in industrial fuel cells, fuel cell and hybrid systems, has joined forces with the Swiss partner consortium hy.muve (hydrogen-driven municipal vehicle) to unveil the world's first street cleaning vehicle equipped with a fuel cell propulsion system. The vehicle was delivered to the Civil Engineering Office in Basle, that is accountable for street cleaning and will test the vehicle as a first operator. Over the next 18 months, the vehicle will undergo extensive practical testing in different Swiss cities.

The compact sweeper vehicle designed for communal use was sponsored by funds from Switzerland and is the result of a cooperation agreement between Proton Motor Fuel Cell GmbH and the companies Bucher Schörling, the Swiss materials testing and research institution Empa, Messer Schweiz AG and Brusa Elektronik AG along with the Paul Scherrer Institute (PSI). Bucher Schörling, a globally renowned manufacturer of municipal street cleaning vehicles, was responsible for the vehicle and system integration. Proton Motor supplied the fuel cell propulsion system. The project was headed by Empa, which also provided designs for the electrical propulsion system.

The basic vehicle is a compact sweeper from Bucher Schörling measuring 3.78 m in length and 1.28 m in width, with a maximum permitted laden weight of 4.5 tons. The fuel cell's nominal output is 20 kW (27 HP). The maximum speed is 40 km/h and the vehicle can operate for more than seven hours on a full tank. The sweeper is filled with 6.5 kg of gaseous hydrogen at 350 bar. This process takes less than 10



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minutes. The hydrogen is stored in pressurised canisters that are stowed behind the driver's cab.

The propulsion concept entails replacing the conventional diesel engine with a fuel cell / battery system and the hydraulic drive train and operating hydraulics with electrical power drives. The hybrid fuel cell propulsion system from hy.muve is a combination of a fuel cell and a lithium polymer battery. At its core is the 20-kW PM Basic A 20 fuel cell system from Proton Motor. This environmentally friendly and highly efficient hybrid technology enables energy savings of around 50 per cent compared to a conventional diesel propulsion system.

Communal vehicles can be used effectively as typical back-to-base applications with just a single local hydrogen filling station. Calculations show that fuel-cell-powered communal vehicles require only half as much energy as current diesel-powered ones. Their operation is also completely emissions-free. Unlike conventionally powered vehicles the vehicle emits absolutely no harmful substances, making it ideal for use in sensitive areas such as pedestrian zones or in closed spaces such as in stations or trade fair halls.

The aim of the hy.muve joint project is to take fuel cell technology from the laboratory to the streets. During the 18-month practical trials in Switzerland, the vehicle's operating performance and ageing characteristics will be tested under everyday conditions. The project is intended to make the new technology 'reality' in the truest sense of the word and encourage the planning and implementation of further hydrogen-fuelled applications.

"After we were recently able to unveil a world premiere with the CityBus, which was based on our triple hybrid system, we are delighted to again be playing a leading role in the hy.muve cooperation project," says Thomas Melczer, Managing Director and CEO of Proton Motor Fuel Cell GmbH. "This means that we can not only showcase our technology leadership in fuel cell and hybrid systems, but also demonstrate our leading role in the implementation of customised solutions in all manner of applications."

Proton Motor Fuel Cell GmbH

Proton Motor Fuel Cell GmbH is an expert in industrial fuel cells, fuel-cell and hybrid systems with more than 15 years of experience in this sector. The company based in Puchheim near Munich offers complete fuel cell and hybrid systems from a single source – from development and manufacture to implementation of customised solutions. The fuel cell specialist focuses on back-to-base applications for fork-lift trucks or city buses, for example, as well as stationary solutions. Its range of products covers PM Basic basic fuel cell systems, PM Package standard complete systems, e.g. as battery replacement, as well as PM Turnkey customised systems. Proton Motor is a wholly-owned subsidiary of Proton Power Systems plc. The company has been quoted on the London stock exchange since October 2006 (Code: PPS).

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