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Light-duty Commercial Vehicle Demonstrator Featuring a Low-cost PCB Fuel Cell

Today the light-duty commercial market is dominated by internal combustion engine powered vehicles, primarily diesel-powered delivery vans, which contribute to urban air quality issues. Global concerns regarding climate change have prompted zero emission vehicles to be mandatory in many markets as soon as 2035. For the light-duty commercial vehicle sector there is significant interest in pure electric vehicles. However, for some markets, or usage cases, electric vehicles may not be the best solution due to practical limitations of battery energy storage capacity or recharging times. For such applications there is growing interest in hydrogen fuel cells as a zero emissions alternative.

Bramble Energy's patented printed circuit board (PCB) fuel cell technology (PCBFCTM) enables the use of cost-effective production methods and materials from the PCB industry to reduce the cost and complexity of manufacturing hydrogen fuel cell stacks.

This paper will describe the integration of a water-cooled PCBFCTM fuel cell system into a light-duty commercial vehicle demonstrator. The details of the bespoke fuel cell stack will be presented. The approach adopted to specify and design the balance of plant for the fuel cell system will also be described. A new fuel cell controller has also been developed and the key elements of the stack operating strategy will be explained. The resulting demonstrator vehicle has been tested and ongoing developments steps to improve the power density and efficiency of the fuel cell system will also be introduced. This demonstrator vehicle has shown that the PCBFCTM technology is a viable technology for automotive applications.