

Obstacles to fast and cheap fuel cell hybrid midi buses

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In a hydrogen session during the recent Connecting Clean Mobility conference in Arnhem, the Netherlands, the president of Spijkstaal Elektro B.V., Mr. Heijboer, discussed the obstacles to be overcome in the field of fuel cell-battery hybrid midi buses with other stakeholders.

[P007 Image 1](#)

As early as 1995 Italy adopted zero-emission bus regulations. This provided the Dutch company Speijkstaal Elektro BV, developer of electric vehicles, with a new market. The company found an Italian partner, Bredamenarinibus, and delivered 60 electrical buses with a 80-90 km radius. The buses can reach a maximum speed of 35 km/h and have room for 32 passengers.

Recently, Rome announced the wish to replace its entire zero-emission bus fleet with buses that will cover 150-200 km without a mid-day battery change and can run up to 45-50 km/h. Speijkstaal would be more than happy to supply, if the company could manufacture such buses at a reasonable price. Speijkstaal, together with the Energy research Center of the Netherlands (ECN) and the Technical University of Delft, looks to a combination of hydrogen and fuel cell-batteries as a solution.

Hydrogenics

In 2005 the German company Hydrogenics developed a fuel cell-battery driven hybrid midi bus as part of an EC and North-Rhein Westphalian sponsored programme. The company, aiming to be the first profitable manufacturer of hydrogen and fuel cell systems, continues its research and innovation.

Hydrogenics' head of sales, marketing and business development power systems Mark Kammerer, attended the CCM session and related his company's achievements over the years. Starting 6 years ago with a fuel cell battery that lasted a mere 100 hours, Hydrogenics has now, in its lab, brought battery operating hours up to 8,000. The accepted minimum for buses is currently considered to be 3,000 hours, but to be competitive with cars the battery should last 5,000 hours at the least.

[P007 Image 2](#)

Obstacles

But difficulties remain. First of all, the market expects that prices do not surpass those of diesel buses. With all the research and development that remains to be done in this field, that is impossible and considered unfair.

Furthermore, the life cycle guarantee of the fuel cell-battery hybrid midi bus is not a 100 per cent. Heijboer: "The market should accept that fact!" But as long as there are alternatives, it remains to be seen whether the market will accept uncertainties. The accepted standard is that passengers need to have 98 per cent certainty. They do not want to be bothered with insecurities, they just want to be transported. Neither do they care much for difficulties to get the bus started in winter.

Last but certainly not least, there is the problem of speed. In Rome, the midi buses drive at an average speed of only 16 km/h. Their maximum is 35 km/h. As Italy, Germany would love to have speedy clean midi buses as well, for instance to run transborder services between the Dutch province of Gelderland and the German border region of North-Rhein Westphalia. But that would take a bus that can run at 80 km/h at the least. And even for German city buses the current maximum speed is not enough.

Next generation

Anyway, with the current battery, the required speed simply cannot be reached. However, a heavier battery would take up too much space. All technical solutions known so far, come down to the question to which extent the weight of the midi bus can be reduced. And to money – nothing new there.

The next generation midi buses may be totally different from the current version. The attendants of the CCM session looked forward to the presentation later that day about variomatics combined with electric motors.