

analyst view

Selling Fuel Cells Globally: Materials Handling Equipment

02 JANUARY 2013



Jonny test driving a Plug Power fuel cell powered MHV. Source: Fuel Cell Today

Certain markets for fuel cells have seen great success during the past few years, but these have tended to be restricted to individual countries. Examples include materials handling equipment (MHE) in the USA and residential micro-CHP units in Japan. In the future, these initial markets will outgrow their current regions, so can these successes be replicated in other parts of the world?

Focussing on MHE, Fuel Cell Today has been following the US-based success of fuel cells in this application for many years, so I looked at fuel cell MHE deployment in Europe and considered what, if anything, is holding it back. On paper, Europe has a greater potential for sales of MHE than the USA, with 2011 data from the [World Industrial Truck Statistics](#) survey reporting that the European market is 56% larger than that in America. The European and US markets for MHE are subtly different: the mixture of models, operating voltage, duty cycles, battery technology and number of batteries per truck all differ and all these must be taken into consideration when implementing any alternative technology.

In the USA, Government funding has been available through the Recovery Act which offsets part of the capital cost and this helped to accelerate uptake there. A special feature on the Recovery Act can be found on page 22 of our [2012 Fuel Cell Industry Review](#). Now customers are placing repeat orders with no Government funding (US-based Sysco Foods) and customers outside the USA ([Walmart](#) in Canada) are showing sustained interest in fuel cell technology.

This funding is perhaps what led the US market to emerge as the dominant location for fuel cells in MHE and, while Europe is likely to follow suit, various regulations, codes and standards (RCS) must first be met. In the European Union the CE mark is required for products to be sold and MHE must comply with the Machinery Directive. More information on general RCS requirements relating to fuel cells can be found in our [recent report](#) containing case studies of commercially available fuel cell products around the world.

European operations traditionally run leaner than their US counterparts in terms of batteries per vehicle. In the US, it is common to have up to 2.5 batteries, on average, per truck, whereas in Europe, this is lower at between 1.7 and 2 batteries per truck. This can affect the overall return on investment because the infrastructure savings could be lower. Hydrogen fuel cells offer a host of additional benefits: the space required for battery changing can be reallocated to store products, thus increasing revenue; at the same time switching from batteries to fuel cells retains the benefit of zero emissions during use (depending on the source of hydrogen); they can also operate in freezing temperatures and other controlled environments. However ancillary equipment savings are not the only argument in favour of switching to fuel cells, and other influences, such as productivity increases cannot be ignored.

As an example battery exchange can take anywhere from 6–7 minutes for the fastest examples and even exceed [fifteen minutes in extreme cases](#). Fuel cell MHE can be refuelled in shorter times, between 90 seconds and three minutes. If we compare the shortest battery change with the longest time for a hydrogen fill, there is a direct saving of three minutes. So if an operation has 50 forklifts, operating three shifts in a 24/7 manner and refuelling once per shift, the time savings are staggering. Even allowing the facility to close for a week over Christmas, time savings equate to over 111 days, or 30% of a man-year. Sysco Foods' 585,000-square-foot foodservice distribution facility in Houston uses fuel cells for its entire MHE fleet of 98 pallet trucks and forklifts; it estimates the fuel cells eliminate about [4,800 hours per year](#) (200 man-days) in battery exchange time alone. Walmart's facility in Balzac, Canada employs 95 fuel cells in its MHE fleet, so will benefit from similar savings; the [company estimates](#) its fuel cell fleet there will save \$1.1 million over seven years and avoid 530 tonnes of CO₂ emissions per year.

Plug Power has led the industry in terms of hydrogen fuel cell deployments to date and currently lists [six OEM partners](#) on its website. It has begun developing its fuel cell MHE offering for Europe through a JV with Air Liquide, HyPulsion. The JV announced in May 2012 that it had [closed a deal](#) to upgrade the entire warehouse operation at an IKEA site in southern France to hydrogen fuel cells. Plug Power even has an [online calculator](#) which will assess the benefits of switching from battery technology to hydrogen fuel cells. Entering your existing MHE fleet data generates a query to its sales team.

So overall there are a number of obstacles to exporting the success of fuel cell MHE from North America into Europe, but these do not appear to be insurmountable. Rather the delays thus far have been due to: the need to gain additional certification for sale in the EU; less favourable financials due to leaner battery setups in use across Europe; and fewer incentives. Potentially most important has been the limited resources of the fuel cell manufacturers themselves meaning they had to select their early markets carefully. Fuel Cell Today expects to see continued growth in fuel cell MHE deployments across Europe, but potentially at a slower rate than that seen in the USA.

Dan Carter Manager
dancarter@fuelcelltoday.com
www.fuelcelltoday.com