

analyst view

Goldilocks and the Three Fuel Cells

18 DECEMBER 2013



L-to-r: Goldilocks, residential micro-CHP fuel cell, telecoms backup fuel cell, Hyundai ix35 fuel cell.

As we approach the end of 2013 it is traditional in the UK for us to reflect on the past year and I have chosen to review three significant developments relating to fuel cell technology which have taken place during the year; these key markets are emerging as leading applications for the technology.

Firstly, [2013 was the year when fuel cells became the most common technology employed in micro-CHP systems](#). Up until 2013 the global micro-combined heat and power (micro-CHP) market was dominated by combustion engine models but, according to industry analysts Delta-ee, the popularity of fuel cells for micro-CHP in Japan tipped this balance such that fuel cells accounted for 64% of global unit sales; a doubling of market share in the past two years. Sales in the Japanese Ene-Farm scheme continue to increase but thus far end-users have been restricted to those in detached houses due the size of the fuel cell systems. [From 2014 a new, smaller model will be released which will target apartment dwellers](#). This product will be the first commercialised fuel cell in the world designed specifically for this purpose and where the fuel cell unit, hot water unit and backup heat source unit can all be stored in the pipe shaft of the building. Initial targets reported by Tokyo Gas are to install around 500 units in the next financial year, but opening up the sizeable market for apartments in Japan is a positive move for the fuel cell micro-CHP sector, both in Japan and abroad.

The [first installations under the European fuel cell micro-CHP scheme, ene.field](#), also took place in 2013. This project is still in its very early stages, but has [aspirations to install around 1,000 units between now and 2017](#). The ene.field project has nine fuel cell manufacturers taking part, and in 2013 some of these began to forge ties with Japanese companies to investigate the potential to export the established technology from Japan to Europe. [Panasonic and Viessmann](#) for example are collaborating to bring a PEM fuel cell micro-CHP system to Europe – where Panasonic sees great market potential for the technology – Panasonic announced in September 2013 that sales of this new system will commence in Germany from April 2014.

The second development also relates to stationary fuel cells, but focusses on a different end-user market. The market for telecommunications backup power is now receiving a large amount of interest from around the world. Fuel cells were given strong support in this sector by the U.S. Department of Energy (DOE) as part of its Hydrogen and Fuel Cells program and through its Recovery Act funding. [The DOE has directly funded 903 fuel cell backup power systems](#) and this support in proving the efficacy of the technology has in turn led to a further 3,500 industry installations and on-order backup power units with no DOE funding.

The USA is not the only country interested in this technology either, and installations are being trialled in [China](#), [Indonesia](#), [The Philippines](#), [India](#) and many more countries. These countries are expanding their mobile phone networks extremely rapidly, and in some cases can not necessarily rely on the electricity grid. Alternative methods of fuelling, such as diesel generators, are subject to fuel theft thus preventing the unit from providing backup power. Fuel cells can circumvent these issues and [newer autonomous models are being commercialised which couple the fuel cell to an electrolyser](#). If solar energy is available, then the unit only needs to be topped up with water, increasing the service interval and further lowering ongoing maintenance costs.

Finally, the third application which saw significant developments was the automotive market. 2013 was a year of continued focus on the commercialisation of fuel cell electric vehicles (FCEV). In February, [Hyundai announced it had commenced production of its ix35 Fuel Cell vehicles](#) at its manufacturing facility in Ulsan, Korea. Hyundai plans to build 1,000 FCEV by 2015 for lease to public and private fleets, primarily in Europe. Partnerships were also formed between the majority of global automakers to accelerate the commercialisation of FCEV including: [Toyota with BMW](#); [Honda with GM](#); and [Nissan joining Daimler and Ford in the AFCC](#). These companies have all reiterated their pledges to introduce FCEV from 2015-2017, and at prices competitive with diesel-hybrid vehicles.

In parallel with these efforts, national hydrogen infrastructure plans have also gathered momentum with firm commitments from [Germany](#) and [Japan](#) to build hydrogen refuelling stations. Other European countries including the [UK](#) and [France](#) are also planning their infrastructure to coincide with the arrival of FCEV. The USA has also taken steps to facilitate the development of a hydrogen infrastructure with the [formation of its hydrogen infrastructure group, H2USA](#), and a recent pledge from the U.S Department of Energy to provide up to [\\$4 million to address critical challenges and barriers for low-cost, low-carbon hydrogen production](#).

Comparing the relatively healthy state of these applications to the many decades of development and the struggle to commercialise fuel cell technology, something new is becoming apparent. The fuel cell sector as a whole has transitioned through times of great hype, where businesses over promised and great things were expected of the technology. Share prices rocketed and a fuel cell bubble was formed; perhaps it all got a little too hot. After this phase, there was an inevitable crash. The technology was still too expensive, the end-user markets were not ready, many investors lost large sums of money and people became disillusioned with it all. At this point perceptions of the industry were that the hype had passed, the bubble burst and things became too cold. What we have seen this year from the examples discussed above, amongst other developments, is that we might finally be entering a stage for the technology where market conditions are improving and applications have been identified where fuel cells can compete with and outsell incumbent technologies. You could say that the temperature is just right.

[Goldilocks](#) would be happy.

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