Breaking News

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Day 2 at Hannover Messe 2007

The second day of the Hannover Fair 2007 saw another full programme of commercial presentations, and an opportunity to spend more time visiting the stands of other exhibitors. Foot fall was still relatively modest in the morning, but it did pick up as the day went on.

The first presentation we attended was by Per Sand, Vice President of Swedish company Cell Impact. Cell Impact has developed a highly efficient system of stamping metal into precise shapes using an effect called adiabatic softening. This effect was noticed, interestingly enough, in the military industry. When artillery shells hit a hard target, for example a tank, the speed of the impact momentarily softens the metal armour which allows the shell to penetrate before the explosive charge occurs. Putting this knowledge to more peaceful means, Cell Impact (the clue is in the name) use a system of 30kg weights accelerated to speeds of 540km/hr to form a metal slug into designed shapes. The company has one production line established, which is predominantly used for making conventional heat exchanger plates for non-fuel cell applications. However they do make bipolar plates for fuel cell companies, and are looking to expand this area of their business. Their production line has the capacity to make 20-30 million bipolar plates per year. Though demand for these levels has not yet emerged in the fuel cell industry, having such a production capacity ready and waiting to go (indeed a second line is due to commence operation in August this year) is likely to be an attractive proposition for fuel cell companies looking to move into mass production.

Similarly to Cell Impact, Dana Corporation of the US also has a production line which they are looking to redirect to fuel cell development. Doug Vanderwees told delegates that Dana has been involved in supplying components to the automotive sector for many years, over which time it has garnered much experience of high quality component design and manufacturing. The thrust of the presentation was that Dana sees itself as being in a strong position to bring these qualities to the fuel cell industry. They are currently making bipolar plates, amongst other products, predominantly on a custom basis for their clients, although they also fabricate standardised core products. They can list Daimler Chrysler as one of their clients in the fuel cell field, and are currently looking for more high-volume clients.

One of the Italian exhibitors we spoke to was Environment Park, a science and technology park in Piemonte aimed at giving early stage companies favourable conditions in which to develop their R&D activities. Besides providing practical amenities (space, general operational services), Environment Park also provides a range of services such as consultancy, testing and integration activities. One of the main organisations within Environment Park is HySyLab (Hydrogen Systems Laboratory). We spoke to Marcello Contestabile, who told us of their work.

HySyLab provides two main functions to companies working in the hydrogen and fuel cell field: technical services, and general hydrogen infrastructure promotion within the region. They have an in-house laboratory, and are able to test membranes and stacks, reformers, and hydrogen storage. They are also able to construct prototypes, and they brought along to the fair a selection of fuel cell scooter prototypes they had built on behalf of their clients.

Marcello said that the region of Piemonte has recently signed an agreement with the neighbouring region of Lombardia to develop a common strategy for developing a hydrogen infrastructure and industry in the regions. The two regions have both been involved in the field of hydrogen and fuel cells for some years now, and have comparable industrial conditions and history. In a similar way to the German Lander and the States in the US, much of the political drive to develop fuel cells and hydrogen technologies in Italy comes from the regional (rather than central) government level. Piemonte and Lombardia have joined together to achieve a critical mass in the hope of attracting highly fought-over EU lighthouse projects as well as other early stage concepts such as the "5th Corridor" – a hydrogen distribution infrastructure running from Portugal to the Ukraine. The two regions have recently committed to spend some 50m Euro over the course of 5 years on their developing joint vision.

German technical university Research Centre Jülich chose the Hannover Fair to present their latest DMFC application prototype – a forklift. They are thus in good company, alongside Ballard and Plug Power who have also entered into partnerships to access the forklift power supply market (see Day 1 report). Two important differences between the offerings of Jülich and these companies are the fuel type and stage of development. Whilst the Plug and Ballard systems rely on the supply of hydrogen, the Jülich system is liquid methanol fuelled – a potentially more 'convenient' fuel for this application; the Jülich system is however at a much earlier phase of development – Plug and Ballard are looking for immediate orders of many thousands of units, whilst Jülich plan to despatch their first 3 field trial units over the next 2 years.

Jülich have been developing DMFCs since 1996 and the team, now numbering 30, is working on aspects of the technology from MEA manufacture (using a commercial Johnson Matthey catalyst), through to cell and stack development and systems integration. For the forklift project Jülich have four industrial partners including forklift manufacturer Jungenrich.

The Jülich forklift employs a hybrid system comprising a 1.6kW (2.3kW peak) DMFC unit alongside a lead acid battery. The battery provides additional power when lifting and is re-charged by the fuel cell. The fuel cell and battery (except one ancillary pump) fit within the standard battery compartment of the forklift and presently allows for 12 hours of continuous operation between refuelling - it is intended that this interval be doubled before commercialisation.

Some key technical characteristics of the Jülich DMFC system include its 'water autonomy' – all water required to hydrate the membrane is drawn from the cathode air flow, thus eliminating the need for water supply; and a closed anode circulation path with all product CO2 exhausted with the cathode air flow, thus eliminating the need for an anode exhaust catalytic burner to deal with un-burnt fuel. A key technical challenge for Jülich is to extend stack life to achieve the 5000 hours required for commercialisation – whilst several thousand hours of operation has been attained at lab scale, stacks produced to date have achieved only 500 hours. We look forward to hearing about the field trials next year.

So we have seen a number of notable themes in the development of fuel cell markets today. First, companies whose current activities are not primarily aimed at fuel cells are looking to move into the field, bringing with them experience and established production capacity gained in other industrial pursuits. They are looking for high volume clients for whom they can rapidly redirect production lines and produce low-cost components. Secondly, in the form of Piemonte's HySysLab, we have seen another example of the growing importance of regional government support for fuel cell development – a format already well established in the US and Germany. Last, the attractiveness of the forklift industry (demonstrated by Plug's recent acquisition of Cellex – see our coverage of Day 1 of the fair) is reconfirmed by Jülich's decision to apply its extensive fuel cell experience in this field.