

Day 1 at Hannover Messe 2007

Fuel Cell Today is once again at the Hannover Fair, and we will be reporting each day this week on the Hydrogen and Fuel Cells Group Exhibit. The Hannover Fair is rightly established as one of the leading events in the international fuel cell industry calendar, and under the stewardship of Arno Evers (and, for the first time this year, Tobias Renz), it has grown steadily since its inception in 1995. For us at FCT, it is a great opportunity to make and renew acquaintances in the industry, find out about new developments, and generally to take the temperature of the industry as a whole.

Exhibitor numbers in 2007 are up, with 133 companies present compared to 100 last year. Looking at the exhibitor list, there are a good number of countries represented, but the show is dominated by German companies to a greater extent than in previous years (70 German companies, 19 US, 7 Italian, with the other countries represented by 1-3 organisations).

Supply chain and application representation are more evenly spread than last year, with the notable exception of the mainstream automotive companies. This is particularly surprising given the traditional strength of the German automotive industry. Why they have stayed away from the Fair this year is a bit of a mystery, but I will endeavour to find out over the course of the next 4 days.

The Fair has assumed its now customary format. The hydrogen and fuel cell exhibitors are grouped together in the Energy hall, next to other sectors such as renewable energy, "conventional" power engineering, and large integrated multinational suppliers. This is one of the strengths of the Hannover Fair – the setup means that there is a steady stream of non-fuel cell industry suppliers and consumers, who have frequently heard of fuel cells but who have not had much direct contact with the industry before. As fuel cell markets approach, the industry as a whole stands to benefit from increased contact with the wider energy community. Of all the big events in the fuel cell calendar, I doubt there are any others which can rival the Hannover Fair in this particular area.

In the middle of the exhibition space is a small stage, where exhibitors are interviewed throughout the day. Again, in keeping with the industrial (as opposed to academic) nature of the Fair, these resemble commercial pitches and provide companies with (literally) a stage upon which to publicise their work. We'll be posting summaries of these presentations throughout the course of the week.

Delegate footfall on this first day has been surprisingly low. But the Fair is longer than the other main fuel cell exhibitions (which typically last for around 3 days) so there is plenty of time yet for the crowds to come. In terms of business-to-business interaction though (amongst exhibitors), the various meeting spaces have been busy.

So, with time in hand to visit the exhibition booths, much of our first day was spent listening to the presentations on stage. First up was Linde, the largest producer of industrial gases in the world. Linde has been a regular participant in fuel cell exhibitions for some years now, in line with their large and growing hydrogen production business. Linde's main interest is in hydrogen supply for industrial use, but they are increasingly becoming involved in supplying the transportation sector. Linde are heavily involved in current efforts to develop hydrogen refuelling stations for demonstration projects around the world, and have two refuelling stations in Berlin amongst others. They also operate the world's only mobile hydrogen refuelling station. Linde recently acquired British company BOC, another producer of industrial gases. With the strength of the two companies now combined, Linde hope to develop their market share in the US and China.

Next was the International Science and Technology Centre (ISTC), an intergovernmental organisation set up following the break-up of the Soviet Union with the intention of mobilising the CIS region's vast technical resources for peaceful ends. The ISTC's emphasis now is on commercialising their partner research institutes' technological skills, rather than the original goal of nuclear non-proliferation. I met the ISTC at Hannover last year, when they were exhibiting for the first time. Since then, the organisation has produced 2 small-scale fuel cell products, and are partnering with Russian utility giant Gazprom and stack developers Arcotronics. ISTC have also recently opened a new unit looking at developing products to combat terrorism. The speaker was at pains to point out that ISTC is essentially a political organisation, which carries out as much politically- and socially-oriented work as it does technical. They have evidently come a long way in the past year, and the dual technical/political nature of their work makes them stand out from the largely technical/commercial organisations present at the Fair.

Professor Alexei Khokhlov, the Scientific Director of NIC NEP gave an outline of his organisation's makeup and goals. NIC NEP was established in 2005, and is the result of a desire to collaborate between Norilsk Nickel and the Russian Academy of Sciences (RAS). The purpose of NIC NEP is to implement the scientific ideas coming out of RAS, and bring them to the level where they are fit for commercialisation. NIC NEP's primary interest in fuel cells is in the stationary sector, which, we were told, is most closely aligned with the market conditions in Russia. Professor Khokhlov suggested that the combination of vast domestic gas supplies, low temperatures, a geographically dispersed population and a lack of existing energy distribution assets in large parts of North East Russia, would serve to create a market for a "progressive" hydrogen distribution infrastructure incorporating fuel cells. He went on to suggest that this would even occur in Russia before it took place in Western Europe, which already has a functional energy distribution infrastructure in place. NIC NEP is looking to established commercial players in the fuel cell industry to further this goal, and is partnering with Plug Power (which last year sold around 30% of its shares to a Russian consortium involving NIC NEP), and German membrane producer Fumatec.

Which leads seamlessly on to Plug Power. John Vogel, Director of Plug's High Temperature Program, first talked about the recent acquisition of Vancouver-based Cellex, who target the market for lift-trucks. We were told that the tie-up with Cellex and its lift-truck technology was a natural extension of Plug's core development of products for the telecoms market - the technological requirements having a compatibility of around 80%. Plug are also developing high temperature polybenzimidazole (PBI) PEMs, which produce high quality waste heat suitable for residential scale CHP, which have a higher CO tolerance than conventional PEMs, and which require no liquid water management systems. Plug have not yet got their PBI PEMs in a market-ready state, but the technology is now an important facet of their long-term market strategy.

Plug power featured again in German company Vaillant's plans for their 4th generation 1kWe combined heat and power unit for the residential market. Unlike previous systems which employed 'conventional' PEM stacks operating at approx. 70degreesC, the new system will employ Plug's high temperature PEM stacks operating at 160-180degreesC. It is expected that the higher operating temperature of the new system will yield improved reliability and reduced cost through simplified balance of plant, made possible by the higher tolerance to CO and impurities of high temperature membranes. Vaillant also have a parallel programme to develop SOFC based systems in partnership with Webasto. Little was said about this, and we hope to expand garner more information over the course of the week.

Ballard, the Canadian veteran company of PEM fame, and direct competitor to Plug, presented several areas of success and of work under development. In transport Ballard now boast over 130 vehicles on the road, with 3 million kilometres covered to date. It was interesting to hear that the CUTE fuel cell bus project, which is coming to an end in the UK has been extended for another year in several countries and may even be extended in to a fourth year in cities. Two noted areas of growth for Ballard are in 'material handling' (i.e. forklift trucks) and residential CHP in Japan.

Forklifts are widely recognised as being an application in which fuel cells can offer immediate economic benefit, due to increased time between 'refuelling' combined with a much speedier refuelling process (1-3 minutes). Ballard has recently signed a contract with General Hydrogen to supply 2,700 units and has previously been working in partnership with Cellex to supply fuel cells power units for forklift trucks to international retail giant Walmart. It is not yet clear what affect the acquisition of Cellex by PlugPower will have on this particular partnership, and this again is something we will seek clarification on over the next week.

Ballard's enthusiasm for the Japanese domestic CHP market is apparently driven by three key factors (1) the large ration of electricity to natural gas cost in Japan, (2) the interest of gas companies in Japan to collaborate and (3) the considerable support of the Japanese government for such projects. It is interesting to note that Ballard, like Vaillant have opted for a 1kWe 'baseload' system, minimising load following requirements.

With regards to technology, Ballard briefly described improvements slated for the next generation Nexus which include a move to self-humidification, integration of air cooling with the cathode air flow and a move to ambient pressure operation; all of which should yield cost and reliability benefits through simplified balance of plant.

And that is all for today. We will be back tomorrow with news on more companies and, hopefully, answers to some of the questions raised today.

Dr Mike Hugh & Dr Ben Todd at Stand E46/4.