



## PRESS - RELEASE

The fuel cell micro CHP units are ready for field testing

### **efc and Technology for the Future for Germany**

Hamburg, Germany, 27<sup>th</sup> May 2005 The Beta 1.5 prototypes are now undergoing their final operation checks in the laboratory. Also all the system components are tested to be optimised in their operational work. In summer 2005, after the efc technicians have successfully completed their system tests, efc's first fuel cell micro CHP units, which have been designed for use in single-family houses, are to be sent on their field tests. Guido Gummert, Managing Director of european fuel cell gmbh (efc) tells us here about the current state of development, as well as the further steps to be taken, before the market launch of these fuel cell micro combined heat and power (CHP) units.

**- Mr Gummert, what did efc get out of the ISH 2005 trade fair in Frankfurt and the "efc Energy Dialogue" event, a forum for leaders within the power supply industry to discuss the fuel cell micro CHP technology in the home and its prospects for the future, that you organised one week before the fair?**

Both of these events were extremely successful and yielded good results. At the ISH 2005, all of our competitors who could be taken seriously presented combined heat and power units which use fuel cell technology – so this is clearly where the trend is going. We are happy to say that the specialist engineers and fitters we spoke to confirmed that our heating technology was perceived as the know-how of the whole Baxi Group, one of Europe's leading heating and home comfort specialists. During the Energy Dialogue event, some interesting perspectives for future cooperation emerged, and individual energy supply companies clearly expressed their willingness to participate in our field trials. Mark Edwards, CEO of the Baxi Group, made himself available to efc throughout the ISH 2005 and the Energy Dialogue event. This demonstrated to us both the great confidence the Group has in efc and its committed attitude towards investment in our fuel cell technology.

**- Why did Baxi – Europe's third largest supplier in the heating industry – acquire efc just three years after it was founded?**

In 2001, the BAXI Group analysed the heating market very carefully, and they came to the conclusion that future heating technology would embrace combined heat and power. In 2002, european fuel cell gmbh was acquired at almost exactly the same time as Senertec. The "Dachs" 5.5 kW gas motor CHP unit from Senertec is already in serial production and more than ten thousand units have successfully been installed. This product is breaking new ground in the market for single and multiple family homes. And, using fuel cells, the efc engineers have harnessed the technology of the future, especially to meet the requirements of single family houses, which represent the greatest market potential for heating units.



**- How is efc managing this development?**

We see ourselves as a manufacturer of a complete system – and our expertise extends right down to the last detail of each and every component. For this reason we have not just limited the product development to the fuel cell micro CHP unit itself, we have also established the technical specifications for each individual component in partnership with carefully selected suppliers. A good example of this is the development of the bipolar plates with the companies Schunk and Freudenberg – who are perceived as world leaders in this field today. For this process a material similar to graphite has been chosen, as many other electrically conductive materials are not able to withstand the corrosive conditions at temperatures of around 80°C for a sufficiently long period. They now manufacture these bipolar plates in a die-casting process, which significantly reduces their costs. This has brought us a significant step closer to our goal – but we still haven't quite reached it. As ultimately for our fuel cell micro CHP unit we require a water-cooled fuel cell stack, with a long lifetime and low manufacturing costs.

**- Just how far are your suppliers and the heating industry fitters involved in your development process?**

As we are both system integrator and manufacturer of the fuel cell micro CHP unit, close cooperation with our suppliers is of fundamental importance. To this end, our engineers require a professional project management approach to map out the various periods of development time for the components supplied. And as for the heating industry engineers and fitters, we are setting up service structures for them, as well as ensuring that they are already participating in our training programmes at the Beta phase. We are also working together with the Heinz-Piest Institute (an institute of the German trade) and vocational schools to train of young Electro-Mechanical Engineers.

**- You would like to begin the field trials this summer. But what have the lab tests of the Beta 1.5 units shown you so far?**

We have been working on the development of the Beta unit since 2001 and, to this end, we have carried out a sequence of tests. First component tests, then modular tests, and we are currently testing the complete CHP unit. All these test sequences follow a strict timetable that includes several milestones. It was very satisfying to find that the performance of the fuel cell micro CHP prototype in the laboratory confirmed the results of calculations we had made, based on a dynamic simulation. We have tested each of the modules for two thousand hours. It was important to carry out these tests in real time in order to be able to guarantee the service life of the unit reliably. The fuel cell stack however, performed significantly better than we expected, so we are considering extending its guaranteed service life in the foreseeable future. When the first Beta prototype was assembled and commissioned in the laboratory, some further options for improvements came to light. For example, the membrane electrode assembly that still required too much moisture. This was one of the main reasons why we were initially only able to assure a few thousand operation hours for the unit.

The assembly of the first field test units is scheduled to begin from the middle of 2005 onwards. For the first two years of operation, efc will be offering a service



contract to its project partners to limit the project costs in the field test. The results of the field trials will be flowing continuously into the development programme.

**- When will efc's fuel cell micro CHP unit be ready for its market launch and what needs to have been done before you get there?**

It is our declared aim to have the fuel cell micro CHP unit fulfilling its task in a single-family home and efficiently generating electricity and heat by the end of this decade. By means of a carefully-thought-out fuel cell stack, our current 4th generation Beta cell stacks have already achieved a 12% improvement in voltage output over the first cell stack prototypes. We are also working on further reducing the electrical demand made on the unit by its own peripheral components. Also the fuel processor will be improved so that it can operate with a reduced surface area, by insulating against heat loss, as well as by increasing the integration and efficiency of the natural gas or H2 conversion. The market for CHP units with an electrical output of between 1 and 2 kW is extremely large. In order for such units to be successful, however, they must have acceptable market prices and low service costs. This means that the service life of the cell stack needs to be raised to around forty thousand hours and the maintenance intervals for the peripheral components, such as the pumps, need to be extended. The considerable development costs – a double digit figure in millions of euros – can only be met as part of the future investment programme of the *Bundesministerium für Wirtschaft und Arbeit* (the Federal Ministry for Business and Work).

**- What are the advantages for the energy suppliers you are working with on the first steps of the field trials for the Beta 1.5 units?**

We are in constant dialogue with energy suppliers and at the ISH we could see yet again that there is great interest in this technology. 30% of the consumption of primary energy takes place in private houses alone – and energy demands are increasing. This is the chance to use natural gas efficiently to produce energy and heat and to supply customers with an individual energy provision service. An important side effect for energy suppliers is that they can cover the cost of construction of gas mains to new residential areas more quickly as a result of CHP technology and – at the same time – increase the use of natural gas in future, as a fossil fuel that does the least harm to the earth's atmosphere. Energy suppliers have already recognised the advantages, such as an increase in sales of natural gas and an improvement in the efficiency of energy supply to their end customers. At the end of the day, it is all to do with having good customer relations in a liberalised market and setting up new areas of business.

**- What CO2 saving potential does your fuel cell micro CHP unit promise us?**

With the coming into force of the Kyoto Protocol, CO2 saving has become an important issue. With a fuel cell micro CHP unit, depending on how it is used, a saving of around 30% can be achieved in a single-family house. We are currently developing our *energy manager* – a piece of software that ascertains the actual individual requirements of a household and, in this way, adapts the energy production of the fuel cell micro CHP unit to the daily routine of the residents of

the house. With the energy manager, further potential savings will then be possible.

**- efc is a subsidiary of a British company. But will the fuel cell micro CHP technology remain a “Made in Germany” technology in spite of this?**

Our fuel cell micro CHP unit will become an European product, while we are in competition worldwide with Japan and the USA who have unbelievably large research funds at their disposal. These can be in the form of direct support or sometimes indirect support, partially assisted by through military contracts. The German fuel cell market may well be technologically the most highly developed, yet development incentives are necessary even in this country if we are not to lose the advantage we already have. For this reason, for sufficient funds to be invested in the project, as a component of our market launch strategy, efc also has plans to enlist government support. New technologies are extremely important for Germany’s competitive advantage, as they save and create new jobs. The supply of technologically sophisticated components such as those found in sensor technology, and the manufacture of valves, will surely remain in Germany. The assembly of the Beta 1.5 will take place at the efc premises in Hamburg - of course the plans are to extend the facilities at its current location. To make all this possible, however, I see no alternative to making further demands on science and politics to provide more funds for the development and marketing of innovative products such as ours.

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**picture caption:** Guido Gummert, efc Managing Director, at the fair ISH 2005, Frankfurt, Germany.

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