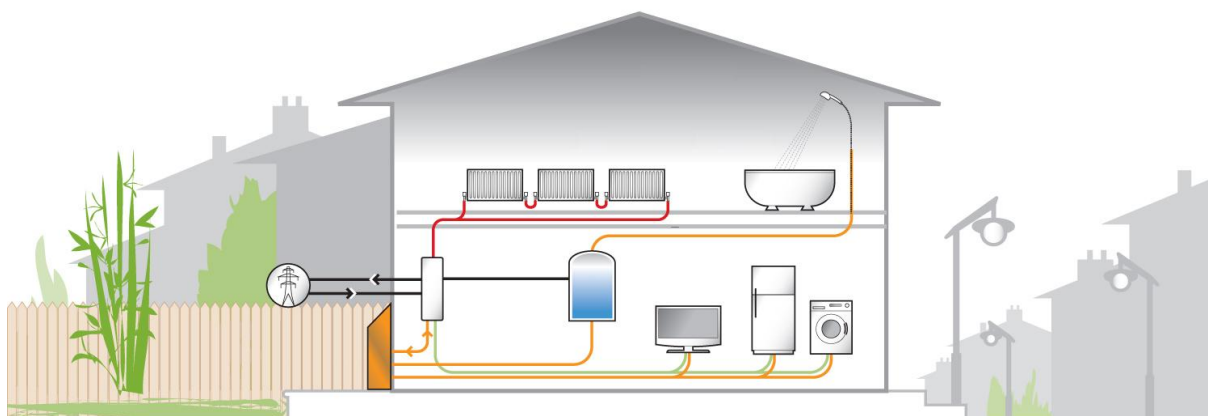


# analyst view

## Residential Fuel Cell Field Trials in Europe

15 AUGUST 2012



In April last year, Dan and I wrote about some of the developments taking place in Europe in fuel cells for combined generation of home heat and power (micro-CHP). With the pioneering Ene-Farm programme in Japan going from strength to strength and thousands of new units being sold there each year, it is apparent that the fuel cell suppliers in this market are beginning to enjoy commercial success. So it seems like a good time to revisit the subject and see what progress Europe is making towards deployment on a scale similar to Japan.

Currently, the largest European project in this area is the Callux field trial in Germany, with systems from Baxi Innotech, Hexis and Vaillant installed in selected homes (the Baxi system is PEMFC, the others SOFC). In June this year, the 260 fuel cell systems installed to date had passed a cumulative one million hours of operation. Logging hours in trial deployments is essential to evaluate the performance of products under real-world conditions as a basis for further improvements. These have been substantial: Callux reports that appliance costs have been reduced by 60%, while costs for maintenance and replacement parts have come down by 90%; availability has increased to over 97%; electrical efficiency has increased to over 33% and overall efficiency to over 96%. To add to this, the systems have become smaller, lighter and more durable.

This, however, is only the first phase of the project: another two waves of installation will take place, bringing the number of units in test to around 550 by the end of 2013. The project ends in 2016, by which time it will have gone a considerable way towards readying the three fuel cell products for commercial launch. Callux falls under Germany's National Innovation Programme for Hydrogen and Fuel Cell Technology (NIP), which also includes separate field trials of 50 PEMFC and 202 SOFC micro-CHP systems as well as other projects in development.

Ceramic Fuel Cells Limited (CFCL) is targeting Europe as an early market for its residential fuel cells and has had a number of multi-unit orders already. It is also participating in a project co-funded by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) called SOFT-PACT that will demonstrate 100 SOFC micro-CHP systems in the Netherlands, the UK and Germany. Specifically, it is intended to show

that a system converting at least 50% of its fuel to electricity can operate reliably under real-world conditions. The first phase of the project is using 40 CFCL BlueGen™ systems to provide electricity and domestic hot water only. In the second phase, a newly-developed prototype system based on CFCL's fuel cell module will be tested: this will have the fuel cell integrated with a thermal store and booster boiler to cover both hot water and space heating requirements as well as electricity. The performance of the two systems will be compared to determine the optimal configuration for cost effectiveness – with the aim of releasing a product to the market as soon as possible.

Micro-CHP fuel cell trials are being run in a few other European countries, a notable example being the Danish Micro Combined Heat & Power project. Phase two concluded recently after the successful test of nine prototypes from IRD Fuel Cells, Dantherm Power and Topsoe Fuel Cell in private homes as well as commercial and public buildings. Once again, the results are being used to improve the systems prior to the next phase of demonstration.

Trials such as these have served as valuable and necessary proof-of-concept and have paved the way for a Europe-wide deployment on a larger scale. A project now in the final stages of negotiation under the FCH JU is set to deliver this deployment. Named ene.field, echoing the Japanese programme, it involves nine fuel cell system manufacturers and almost a thousand installations across twelve EU member states. These will run for at least three years in demonstration, with the project ending in 2017. The heat-to-power ratio of the systems will be geared towards more modern European houses, which have a low space heating requirement and are thus ideally suited to fuel cell micro-CHP.

The ene.field project will allow the equipment suppliers to develop market-ready products and cement supply chains. Of equal importance is creating a receptive market and to this end the project will report on environmental and economic performance, aiming to present policy makers with the evidence they need to support market introduction.

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