



# Micro-CHP Fact Sheet United Kingdom

This is one of a series of fact sheets published by COGEN Europe to provide information about the status of micro-CHP in different European countries.

## What Is Micro-CHP?

There are many different definitions of micro-CHP, or micro-cogeneration. Micro-CHP products are typically run as heating appliances, providing space heating and warm water in residential or commercial buildings like conventional boilers. But unlike a boiler, micro-CHP generates electricity together with the heat at very high-efficiencies and therefore helps to save fuel, cut greenhouse gas emissions and reduce electricity costs. Most units operate in grid-parallel mode, so that the building continues to receive some of its electrical needs from the electrical network, but it may also export some electricity to the network. The European Cogeneration Directive defines micro-CHP as all units with an electrical capacity of less than 50 kW. This fact sheet will focus on units in this size range. These can be used to provide heating and electricity to district heating schemes, apartment buildings, commercial buildings and small industries. They can also run on biogas. These products are either already available commercially or they are close to market entry.

## Micro-CHP Products in the UK

Four units are currently being sold in the UK.

► **WhisperGen.** Producing 1 kW of electricity and 8 kW of heat, it is built around a Stirling engine and designed for use in individual homes. It is manufactured by Whisper Tech and is currently being sold, as part of a market trial, by E.ON UK. In August 2004 E.ON UK announced an order for 80,000 WhisperGen units which they plan to sell to households over the next five years.

► **SenerTec DACHS.** Producing 5.5 kW<sub>e</sub> and 12.5 kW<sub>th</sub>, it is built around an internal combustion engine. It is manufactured by SenerTec, a subsidiary of Baxi, and sold by Baxi Technologies. It's typically installed in places such as sheltered housing accommodation and small commercial buildings.

► **Ecopower.** Producing 4.7 kW<sub>e</sub> and 12.5 kW<sub>th</sub>, it is also built around an internal combustion engine. It is manufactured by Power Plus Technologies, a subsidiary of Vaillant. It's typically installed in similar places as the DACHS unit.

► **EC Power.** This is a fully automatic system with heat storage, real time load following, automatic peak-shaving and optional integrated heat-pump system control. The natural gas-fuelled engine unit generates 3-12 kW of power and 17-32 kW of heat (Light oil: 4-17 kW<sub>e</sub> and 10-25 kW<sub>th</sub>). Typical installations are in apartment blocks, small commercial buildings, farms and office buildings.



WhisperGen micro-CHP unit in a kitchen



SenerTec DACHS micro-CHP unit

Other UK companies are also developing micro-CHP units, amongst them Baxi Group and Microgen, both working on 1 kW micro-CHP products suitable for individual homes.

## Market Potential and Environmental Benefits

Of the 24 million households in the UK, as many as 14 to 18 million UK households are thought to be suitable for micro-CHP units. If micro-CHP were installed in all these households, this would comprise as much as 20 GW of electrical capacity.



Small hotels have high and constant heat demands, making them suitable for micro-CHP

The UK housing stock has relatively low levels of insulation and therefore requires higher levels of heating compared to much of north-west Europe. For example, only 14 per cent of UK homes have full insulation – that is loft insulation, cavity wall insulation and double glazing. This, and the fact that only 18% of all homes are classified as flats, resulting in many homes have high heating requirements, helps to increase the potential for micro-CHP.

Current and near-to-market 1 kW micro-CHP units are estimated to reduce a typical household's CO<sub>2</sub> emissions by at least 1.5 tonnes a year.

## Routes to the Market

For residential applications, micro-CHP is typically installed instead of a conventional boiler. For small commercial applications, it may operate alongside a conventional boiler, and multiple units may be installed in some cases.

There are currently two routes to market for micro-CHP in the UK, although others may emerge in the future.

► *Utilities to residential customers.* E.ON UK are currently selling the WhisperGen product to households as part of a market trial. Centrica have an agreement with Microgen to sell their product when it is commercially available.

► *Direct to small commercial energy users.* Baxi Technologies are currently selling the SenerTec Dachs unit directly to organisations such as local authorities and providers of sheltered accommodation

## Micro-CHP Economics

Whilst there is no single economic case for micro-CHP, two examples are shown below.

### WhisperGen unit installed in 3-bedroom semi-detached house

Additional cost compared to a boiler	£500 / €712
Electricity produced	2,400 kWh
Heat produced	18,000 kWh
Value of electricity produced <sup>a)</sup>	£150 / €213
Cost of additional gas used <sup>b)</sup>	-
Annual savings <sup>c)</sup>	£150 / €213
Simple payback	3.3 years

The exchange rate between UK Pound and Euro was 1.42 on 18 November 2004. This example is based on analysis by EA Technology (2001)

a) assuming 85% of electricity generated is used within the house

b) assuming it replaces a boiler with less than 80% efficiency, as typically found in the UK

c) assuming no incremental maintenance costs over that required by a conventional boiler

### DACHS unit

Based on a unit running for around 6,000 hours a year, for instance in a sheltered housing application, with all the electricity generated used on-site (all prices exclusive VAT).

Installed cost	£12,000 / €17,160
Maintenance cost	£650 / €930
Electricity price per kWh	£0.06 / €0.085
Gas price per kWh	£0.012 / €0.017
Annual CO <sub>2</sub> savings	5 tonnes
Payback period	App. 14 years

The exchange rate between UK Pound and Euro was 1.43 on 24 November 2004; Figures from Baxi Technologies (2004)



EC Power micro-CHP system



Microgen micro-CHP unit (under development)

## Regulatory Changes Affecting Micro-CHP

Over the last three years there have been a number of key changes to regulations affecting micro-CHP in the UK. These include:

► Simplified grid interconnection, known as G83/1, whereby permission from the distribution network operator is not required to connect type-approved micro-CHP units producing less than 16 amps per phase to the grid.

► Amendment to the metering regulations, so that a micro-CHP installations only require a straightforward export meter, rather than a half hourly one.

## Government Policy and Incentives

The UK Government is, in principle, supportive towards micro-CHP in light of the environmental benefits and social benefits it can bring. Initiatives to support micro-CHP include:

► The Carbon Trust (funded by the Government) is running a field trial of micro-CHP units, monitoring the energy and financial savings.

► In 2005 the Government, subject to field trials results, will reduce the rate of VAT (value added tax) on micro-CHP units from 17.5% to 5%.

► For non-residential energy users paying the Climate Change Levy, a levy on electricity and gas sales, CHP that is certified as "Good Quality" is exempt from the Levy.



Like a conventional boiler, micro-CHP operates as a heating appliance in residential buildings

Some of the measures and actions for which micro-CHP generators are arguing for include:

► A temporary increase in the value of savings accredited to micro-CHP within electrical and gas retailers energy efficiency targets. This is in order to kick start the market and to compensate micro-CHP for market failures that do not fully reward the benefits it brings.

► Development of a Government strategy on micro-generation.

► Fair treatment of micro-CHP within the review of distribution charges and distributed generation.

## Contacts and Further Information

► *The Micropower Council* ([www.micropower.co.uk](http://www.micropower.co.uk))  
A focal point for small scale generation in the UK.

► *CHP Association* ([www.chpa.co.uk](http://www.chpa.co.uk))  
The trade association for CHP in the UK

► *COGEN Europe* ([www.cogen.org](http://www.cogen.org))  
The European Association for the Promotion of CHP