

## Micro-CHP: the Next Generation Solution



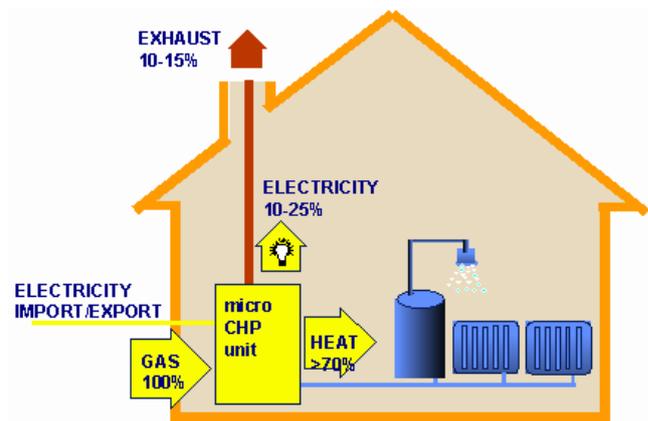
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For existing buildings, heat demand remains high and the ability to retrofit many renewable technologies is physically limited. For much of the existing housing stock, micro-Combined Heat and Power (micro-CHP) is therefore the next generation solution. It is a high efficiency solution for a market with a current annual potential of around a million units a year across Europe. Larger scale up-take of micro-CHP technologies will relieve the pressure on the electricity grid, while allowing greater [active participation of consumers](#) in the management of their energy consumption.

### What is micro-CHP?

Micro-CHP refers to the **small-scale production of heat and power for commercial and public buildings, apartments and individual houses**, defined in EU legislation as installations with an electrical power output of **less than 50 kW<sub>e</sub>**. With the ability to attain overall efficiencies above 85 %, micro-CHP units meet the demand for both space heating and hot water, and potentially cooling, while providing electricity to supplement or replace the grid supply.

The micro-CHP technologies that are already present on the European markets in quantity are based on **Stirling engine, Organic Rankine Cycle (ORC)** or **Internal Combustion Engine (ICE)** technology, characterised by **high heat-to-power ratios**. This makes them most suitable for installation in existing houses. Newer technologies based on fuel cells are just being launched into the market with the largest field trial in Europe, [ene.field](#)<sup>1</sup>, currently under way. **Fuel cell micro-CHP technologies** offer exciting new opportunities as they primarily generate electricity with heat being produced as a by-product, making them a good fit to the new low energy buildings of the future. A [wide range of applications](#) can be found in the [BUILD UP Community 'Micro-CHP in buildings'](#).



WHAT IS MICRO-CHP?  
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### Micro-CHP benefits

Micro-CHP allows the supply of both heat and electricity from a single energy source, **fostering security of supply** and **enhancing the grid's ability to meet peak electricity demand**. The market up-take of micro-CHP can also deliver **important energy bill savings** to households and businesses through the reduction of imported electricity and by allowing users to sell the surplus electricity back to the grid.

<sup>1</sup> The research leading to these results has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) for the Fuel Cells and Hydrogen Joint Technology Initiative under grant agreement n° 303462.

**Carbon emissions are reduced** by generating electricity at the point of use – avoiding the system losses associated with central power production.

Comparing micro-CHP to a condensing boiler, an engine based micro-CHP unit [could save around 1.7 tonnes CO<sub>2</sub>/year](#) for a typical family home, whereas a [Solid Oxide Fuel Cell \(SOFC\)](#) could save more than 4 tonnes of CO<sub>2</sub>. According to the [Carbon Trust](#), which carried out the [Micro-CHP Accelerator](#) field trial in the United Kingdom between 2005 and 2008, **micro-CHP delivered average carbon savings of 9 % for houses with heat demand over 15 000 kWh/year**. Emission reductions can be even more substantial in the case of small commercial sites, where the field trial documented 16 % carbon savings.

Micro-CHP can therefore be a **key enabler for the EU** to deliver on its objectives of competitiveness, sustainability and security of energy supply.

### Micro-CHP is on the market

Micro-CHP is better placed than ever to move beyond the early market stage and reach the mass market. Manufacturers, including BDR Thermea, EC Power, Honda Motor Europe, Panasonic, SenerTec, Vaillant and Yanmar Europe, are in a **market expansion phase**; major companies are backing them to reach customers; some governments including Germany and the United Kingdom are stepping up to provide financial support and **initial feedback from customers is positive**.

Currently, the largest volumes are being sold in **Germany**, in response to the generous [incentive scheme](#) that covers part of the capital costs and rewards generated electricity with a bonus for up to 10 years or the equivalent of 30 000 full operating hours. German consumers appear to be quite receptive to new technologies, such as micro-CHP, [heat pumps](#), solar PV, and willing to adopt them.

The recently adopted [Energy Efficiency Directive \(EED\)](#) and forthcoming [Eco-design Lot 1 \(Boilers and combi-boilers\)](#) implementation measures open [great opportunities to accelerate the mass market launch of micro-CHP in other European countries](#).

### Market prospects beyond 2020

According to the report [Cogeneration 2050](#), published in the framework of the IEE supported [CODE project](#), micro-CHP technologies, mostly fuelled by renewables, hold a large potential of contributing to EU's 2050 decarbonisation goals. The upcoming [COGEN Europe Annual Conference 2013](#) (18-19 April 2013, Brussels) has a session entirely devoted to micro-CHP and fuel cells, where an update will be provided on **new developments of applications in houses and small commercial premises**.

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