Micro-CHP Fact Sheet
Netherlands

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 Netherlands

Around one hundred 5 kW_e gas engine micro-CHP units have been installed in the Netherlands. The vast majority of these are SenerTec units, with a couple of Ecopower unit also installed.

► *SenerTec Dachs.* Producing 5.5 kW of electricity and 12.5-kW of heat, this unit is built around an internal combustion engine. It is manufactured by SenerTec, a subsidiary of Baxi, and sold by Energie Service GelreFlevo Warmtekracht b.v, who have sold around 100 SenerTec of these units in the Netherlands. Typical applications include small hotels, swimming pools, apartment blocks and nursing homes.

► *Ecopower.* Producing 4.7 kW of electricity and 12.5 kW of heat, it is also built around an internal combustion engine. It is manufactured by Power Plus Technologies, a subsidiary of Vaillant.

SenerTec DACHS micro-CHP unit

Ecopower micro-CHP unit

In addition to this other micro-CHP units have been, or are planned to be installed as part of field trials.

► f Several 5-kWe fuel cell micro-CHP units developed by Vaillant have been installed in multi-family homes and small commercial buildings as part of a European wide field test.

► Enatec are a Dutch-based micro-CHP development company, developing a 1 kW_e Stirling engine designed to replace a conventional boiler for individual homes. Enatec have several units currently running in homes as part of a field test.

► Gasunie are testing various micro-CHP units in their laboratories, and in partnership with some of the electricity and gas distribution companies, are planning a field trial of as many as one hundred 1 kW_e Whispergen micro-CHP units, commencing in late 2004.

Like a conventional boiler, micro-CHP can be applied as a heating appliance in dwellings or commercial buildings

Market Potential and Environmental Benefits

The Dutch market offers considerable potential for 1 kW sized micro-CHP units suitable for individual households. Of the 6.5 million households in the Netherlands, the vast majority have access to natural gas, typically using gas fired boilers to provide their thermal needs. The high proportion of Dutch homes with individual heating systems means that there is good potential for micro-CHP in the Netherlands.

The Dutch micro-CHP working group, led by consultancy Cogen Projects, have identified around 3.5 million homes with average or higher than average heat demand, therefore having a good potential for near-to-market 1-kW micro-CHP units. For the first million near-to-market micro-CHP units installed, CO_2 emissions would be reduced by 0.8 to 1.4 million tonnes.

Routes to the Market

The only micro-CHP unit currently being sold in significant numbers on a commercial basis is the SenerTec unit, suitable for small businesses. This is typically sold directly to end users by SenerTec's Dutch distributor, Energie Service GelreFlevo Warmtekracht.

In the future, gas and electricity distribution companies may provide a route to market for the smaller 1-kW systems in the future; direct sales to households are also possible. A number of the distribution companies are currently involved in field trials, for example with the 1-kW WhisperGen units for larger 5-kWe Vaillant units.

WhisperGen micro-CHP unit in a kitchen

Enatec micro-CHP unit (under development)

Micro-CHP Economics

SenerTec DACHS unit

This example is for a unit running in a small business for 18 hours a day with nearly all the electricity generated used on-site. The payback is very sensitive to the amount of electricity used on-site and the running hours, and significant differences are found for different applications.

Installed cost	€14,000
Electricity produced	35,640 kWh
Heat produced	81,000 kWh
Value of electricity produced	€3,581
Cost of gas used above that used by a normal boiler	€1,518
Maintenance cost	€650
Annual savings	€1,341
Value of tax credit	€2,700
Simple payback	8 years

Figures generated by Energie Service GelreFlevo Warmtekracht together with Cogen Projects

1-kW Micro-CHP Unit

The economics of running a 1 kW micro-CHP unit in an individual household will depend on the characteristics of a particular product, energy prices and the household in which it's installed. Analysis by the Dutch micro-CHP working group shows that annual savings for typical households, using near-to-market units given current market conditions could lie between €80 and €150.

Government Policy and Incentives

The Dutch Government is, in principle, supportive towards micro-CHP (as well as larger cogeneration) in light of the environmental benefits it brings.

Businesses purchasing micro-CHP units are entitled to tax breaks on their investment. However at present there are no incentives for households to purchase or use micro-CHP.

Regulatory Issues

A number of regulatory aspects affecting micro-CHP were not designed with micro-CHP in mind.

These include issues such as the right to interconnect micro-CHP with the distribution network; metering requirements for micro-CHP; and valuing micro-CHP generated electricity that is exported to the grid. The current situation is not preventing the installation of micro-CHP units, but does present possible problems if large numbers of 1 kW units were to be installed in households.

Cogen Projects facilitate a micro-CHP working group, consisting of micro-CHP product developers and manufacturers, electricity and gas distribution companies, distribution network operators and others. This group is currently examining a number of these issues.

Sulzer Hexis fuel cell unit (under development)

Vaillant fuel cell unit (under development)

Contacts and Further Information

► *Cogen Nederland (www.cogen.nl)*
The trade association for cogeneration in the Netherlands. Together with Cogen Projects they run a micro-CHP working group for the Netherlands

► *COGEN Europe (www.cogen.org)*
The European Association for the Promotion of Cogeneration

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