# Case study factsheet
# Hobro, DENMARK

Co-funded by the Intelligent Energy Europe Programme of the European Union

# On-site CHP in a sports center

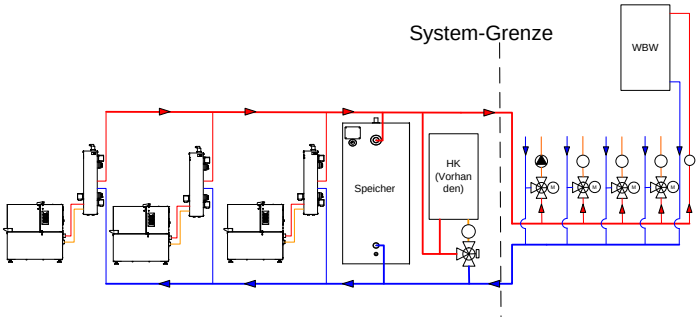
## Municipal/Micro CHP

## Main CHP project indicators

| | | |
|---|---|---|
| Heat capacity (total) | $kW_{th}$ | 90 |
| Electrical capacity (total) | $kW_{el}$ | 45 |
| Technology | Motor engine | |
| No. of units | 3 x XRGI 15G-TO | |
| Manufacturer | EC Power A/S | |
| Type of Fuel | Natural gas | |
| Heat: yearly generation | MWh | 601 |
| Electricity: yearly generation | MWh | 303 |
| Year of construction | 2007 | |
| Total investment costs | EUR | 115.000 (2013-level) |
| Financing | Customer purchase | |
| State support | None | |
| Return of investment (payback period) | Years | 2,9 |
| Location | Hobro idraetscenter, Hobro, Denmark | |

## Picture

## General description of the case



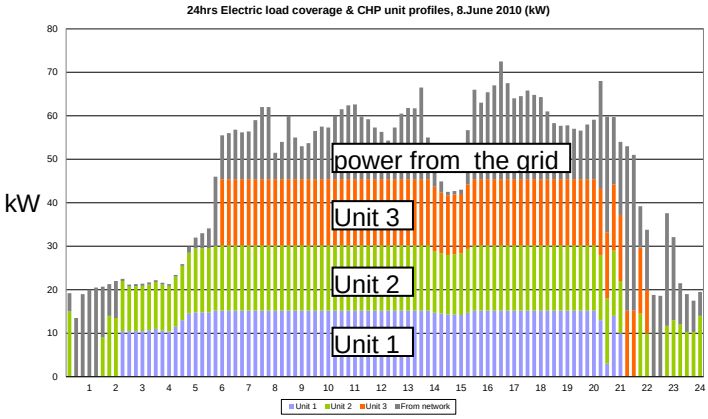

Municipal sports centre. Boiler-room installation using present 500 kW boiler as backup.

Basic hydraulic system as outlined above with chp's, boiler and thermal store in parallel, all controlled by ECP QNetwork system. Flow/return 80°C/40°C.

CHP heat coverage: Summer 100 %, annual average 60 %

Electricity: Acute electrical load-following operation with fully automated, "learning" load-sharing and -modulation of individual units. No electricity sale (elec sale is not economically viable in DK)

Below is shown a typical 24h power load & production profile. (Early summer, chp operation slightly limited by heat consumption)




CHP power coverage: Annual average 65%.

## Success factors

Due to taxation, prices for both natural gas and electricity are high in Denmark. Present price level for this type and size of customer is about 8 cent/kWh for gas (GCV), and 25 cent/kWh for electricity (both excl. VAT).

Downside is that widespread tax refund systems are highly complicated & counter-productive enough to render in particular mini-chp operation not worthwhile wherever these systems occur. This is the case at most commercial sites, and it is also the case in relation to electricity sale – which therefore is an absolute "no-go".

Type of customer therefore becomes the primary success factor: A potentially good customer is without any kind of refund on energy taxes.

## *Main barriers*

There is absolutely no subvention for mCHP in DK; on the contrary they have to pay a special NOx-tax *and* PSO (fee for RES support).

The main barrier in DK lies in the primary energy calculation system used by the energy suppliers' consultants under the compulsory energy saving programmes, which are the primary drivers in the market. Here a primary energy factor = 1 is used for electricity for heat, making heat pumps unbeatable in the calculations. I.e. the consultants will never recommend a mCHP.

## *Comparison: before and after*

Customer benefits: Vastly reduced energy costs primarily through on-site power production, but also through increased system efficiency. This includes efficiency gains on boiler operation (not calculated) due to availability of thermal store through QNetwork control system.

Net. savings: 40.000 EUR/year (=18,4 %); primary energy savings: 439 MWh (=19 %)

These figures cover a 65 % reduction in electricity purchase, a 28 % increase in natural gas consumption, and added service & maintenance costs.

## *Conclusions*

Basically, operational economy for mCHP in DK is in some sectors quite good, but secondary conditions make the market very troublesome to deal with.