

Environmentally friendly and economical energy supply for industrial production

In autumn 2003 the american company Procter and Gamble, the worlds biggest producer of hygiene and household products, entered an energy contacting agreement with Crailsheim's department of works for their factory in Crailsheim/Germany. A CHP (combined heat and power plant) was manufactured in record time and was started up in the middle of December 2003. CHP produces electricity and heat (cogeneration) very environmentally friendly which is why it is subsidised by the German Government. Since the government decided to exempt CHPs from tax for electricity and natural gas, they have become even more profitable to operate.

In the past, CHPs were mainly used for communal facilities like indoor swimming pools and hospitals. But due to ever rising electricity prices, using CHPs in the industry is now becoming profitable too. Crailsheim's department of works supplies Procter and Gamble with electricity and heat and, at a later stage, even with refrigeration. The city's department of works is responsible for financing, operating and supervising as well as servicing the entire plant.

The size of the CHP plant was calculated by determining the factory's yearly requirement for thermal and process heat. Considering the space capacity in the factory and the need for high reliability, two CHP compact modules "GG 340 SH" from **SOKRATHERM**, a german CHP-packager, were the perfect solution, each with 340 kW electrical and 490 kW thermal output. This probably world wide smallest CHP in its power category comes in a soundabsorbing case with an integrated switch cabinet and is ready to be connected. The CHPs were lifted onto the buildings first floor with a forklift and were connected and started up in the factory's boiler room within a week. The CHPs had already been factory tested and therefore did not have to be taken apart for transport and delivery, unlike most CHPs of this class from other packagers. The CHPs have a special internal vibration damping, so no special foundation was required.

As soon as they were started up, the CHPs were running continuously to heat the factory's buildings, even throughout the holidays between Christmas and New Year. Until their first service after 1000 operation hours, both modules ran trouble free. There was no need for any service works or checks, due to the CHP's big integrated tank with lubricating oil. **SOKRATHERM** developed a special remote monitoring system called "TeleManager" which reports any occurring problems via fax, SMS or e-mail. Any CHP can be accessed from any computer with a modem to read and evaluate operating data and special occurrences. Performance data can be accessed from a distance at any time and even displayed in a chart on a computer. Any parameter can be changed and errors or operating problems solved. **SOKRATHERM** uses this way of supervising all their operating CHPs and so does the department of works in Crailsheim in this case.

Changes in requirement for heat can be adjusted by a 8000 litre hot water tank, that is filled up from the CHP. Should even more heat be required, the CHP and the hot water tank can provide, an additional peak load boiler can be switched on. The CHP not only supplies electricity and heating for the buildings in the winter months. At a later stage this cogeneration plant will also be used to operate the buildings absorption chiller system for refrigeration in the hot time of the year. So the CHP is used all year for tempering all buildings, which makes it so profitable. The CHP is controlled with a building control system, which evaluates the buildings heat or refrigeration needs and automatically activates the CHP modules or/and the peak load boiler.

The operating gas engines from MAN and the three-phase synchronous alternator from Leroy-Somer guaranty a safe and reliable electricity and heat supply. CHPs efficiently use over 90 % of the natural gas and needs about 30 % less primary energy than large-scale power plants. CHP plants also help reducing pollutant emission of about 20 % No_x and almost 60 % Co_2 . This equals 3000 tons of Co_2 emissions every year.

Technical data:

CHP module: Type GG 340 SH, 340 kW electrical and 490 thermal output, 922 kW input (electrical efficiency 37 %, thermal efficiency 53 %) from **SOKRATHERM**® GmbH & Co. KG,
Gas engine: Typ E 2842 LE 312 from MAN Nutzfahrzeuge AG,
Alternator: three-phase synchronous alternator from Leroy-Somer.