



Small CHP Unit Installed in Hotel Bankja palace, Bulgaria Sofia Energy Centre, Bulgaria

Summary

A small CHP unit on natural gas was installed in the summer of 2003 in Hotel Bankya Palace, town of Bankya, Sofia region. The unit has 150 kW electrical capacity and 226 kW thermal capacity. The aim of hotel management is to improve the energy situation of the hotel and therefore to reduce energy bills providing in the meantime higher quality service - room comfort and all-year-round usable swimming pool.

End-user area

- New buildings
- Refurbishment of buildings
- Transport and mobility
- Financial instruments
- Industry
- Legal initiatives (regulations, directives, etc)
- Planning issues
- Sustainable communities
- User behaviour
- Education
- Other

Target Audience

- Citizens
- Households
- Property owners
- Schools and universities
- Decision makers
- Local and regional authorities
- Transport companies
- Utilities
- ESCOs
- Architects and engineers
- Financial institutions
- Other

Technical

- Energy efficiency
- Heating
- Cooling
- Appliances
- Lighting
- CHP
- District Heating
- Solar energy
- Biomass
- Wind
- Geothermal
- Hydro power
- Other

Context

Within OPET CHP/DH Project funded by EU FP5 Programme Sofia Energy Centre undertook promotion of Small Scale CHP in Bulgaria by collecting case-studies of successful SSCHP units in district heating, industry and hotel/sport centres. Following is a description of a SSCHP unit installed in a Bulgarian spa hotel.

Bankya Palace is a spa hotel located at the foot of Vitosha Mountain, at only 20 km from the capital city of Sofia. It is a three star hotel with 27 rooms and 7 apartments, with a swimming pool, a bowling club, a restaurant and a night club. Apart from hotel and recreation facilities the site has developed conference tourism there are three fully equipped conference rooms of different size, a computer hall, as well as ISDN Internet connection in each room. Due to the above reason the hotel keeps relatively stable rate of occupation during all seasons. This in turn justifies the introduction of CHP for space heating, domestic hot water for the rooms and catering services, and for heating up of the swimming pool.

Objectives

The objective is to collect information and present to broader audience in Bulgaria the numerous benefits of SSCHP technology for industry and hotel sector. For this purpose a team of Sofia Energy Centre visited the hotel and had meetings and discussions with the hotel management and the energy manager. The hotel energy manager provided the respective reference data of SSCHP project installed and expressed the satisfaction of results related to improving the energy situation and consequently, economic and financial results and improved competitiveness of the hotel.





Process

The CHP unit Cento 140 is manufactured by TEDOM company, and is supplied and installed by Chime Ltd., Bulgaria. This is a turn-key project - the supplier undertakes feasibility analysis, design, installation, commissioning, tuning/adjustments and maintenance of the CHP unit.



The CHP installation is designed for all year round operation and during the heating season additional conventional gas fired boiler is used to cover the high heat loads. As this is the initial period of CHP tuning and adjustments, so far the unit has worked for 1820 hours at 50 % of its capacity. At present the hotel is being expanded with additional 40 rooms which will significantly increase the heat loads of the hotel and the CHP operational hours are expected to reach about 6000 h/annum at full capacity.

Cento 140 is a gas fired CHP unit with electrical capacity of 150 kW and thermal capacity of 226 kW. It is driven by a gas combustion engine type Shkoda Liaz M1.2 G with LSA 46.2L6, Leroy Somer generator.

The system has an overall efficiency of 87 % and consumption of natural gas of 45,5 Nm³/hour at 100 % capacity utilization and 31,5 Nm³/hour at 50 % capacity utilization.

There is also control and power switchboard mounted at the unit for fully automatic operating and permanent automatic diagnosis of its condition.

Financial resources and partners

The overall project costs are about 145 000 Euro. The applied financing scheme is the hotel's own financing at a 10 year leasing agreement with the equipment supplier company Chaim Ltd., with one year grace period. Sofia Energy Centre undertook the promotion and dissemination of information about the success of the project within OPET CHP/DH project activities.

Results

The calculated payback of the CHP installation in Bankya Palace is 3,5 - 4 years under the agreed leasing conditions and current prices of natural gas.

At the projected life-time of 20 years, it is evident that this type of investment is very profitable provided that the hotel keeps a relatively stable rate of occupancy, which will allow for 100 % of CHP capacity utilization and over 6000 running hours/year. The hotel management is rather confident that in the form of conference tourism and spa services, using the available mineral water in the area, they will be able to utilize to the maximum of the hotel capacities and therefore achieve and even exceed the projected CHP economic results.

Lessons learned and repeatability

The replication potential of this type of projects is significant in Bulgaria.

Similar projects can be realized in:

- Hospitals and other medical facilities;
- Hotels and large buildings;
- Greenhouses;
- Small industries;
- Heating companies, etc.

It should be noted that there are some crucial factors for SSCHP profitability:



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- Business situation of the company/site - markets, hotel occupancy, etc. leading to full CHP capacity utilization and high number of operational hours;
- Prices of natural gas;
- Energy prices - of heat, electricity, purchase price of excess electricity and/or heat. They will further increase with the foreseen market liberalization in Bulgaria, which will add to SSCHP projects additional economic benefits.

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