



Small CHP Unit Installed in Vratitza textile factory, Bulgaria Sofia Energy Centre, Bulgaria

Summary

A gas-fired SSCHP was installed in a private textile/knitwear factory in Bulgaria—Vratitza Joint Stock Company. The unit has a 519 kW electrical capacity and a 653 kW thermal capacity. The main aim of the project is to improve the energy situation of the factory, to reduce energy costs and therefore – to improve the economic/financial results and competitiveness of production.

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 textile factory.

Vratitza JS is a factory for producing yarns, fabrics and finished garments - bed linen, clothing, home interior articles. There are several production departments - spinning, weaving, finishing & printing, sewing production, and apart from space heating there is all-year round consumption of heat for technological purposes. This makes the factory particularly suitable for CHP introduction, as it will increase the operational hours of the installation and therefore, the economic results and profitability of the project. The factory has almost 1400 employees in total and an overall annual turnover of about 9 MEuro. The major share of sales (about 70 %) is exports to EU - Italy, Sweden, Greece, etc.

Objectives

The objective is to collect information and present the numerous benefits of SSCHP technology for industry to a broader audience in Bulgaria. For this purpose a team of Sofia Energy Centre collected information about the factory and the SSCHP unit installed. The data and information revealed the benefits of the project and its



results related to improving the energy situation and consequently, economic and financial results and improved competitiveness of the hotel.

Process

The CHP unit CAT 500 SP+E manufactured by the Czech company TEDOM, was installed in the factory. The supplier company is Chime Ltd., Bulgaria, providing a turn-key project - feasibility analysis, design, installation, commissioning, tuning/adjustments and maintenance of the CHP unit.

The CHP unit is designed to operate all-year-round (over 6000 hours/annum) supplying heat for technological purposes of production departments as well as for domestic hot water production and for space heating (during wintertime) of factory premises. The CHP unit is connected in parallel to the national electricity grid - in average about 60 % of co generated electricity is self-consumed, the rest is sold to the national grid. So far the CHP unit has over 5000 operational hours proofing the calculated benefits.



CAT 500 is a gas fired CHP unit with consumption of natural gas - 144 Nm³/hour at 100 % capacity utilization and 113 Nm³/hour at 75 % capacity utilization. It has a block configuration containing a Caterpillar genset (gas combustion engine type G 3508 and a 400V, 50 Hz generator). The system has an overall efficiency of 86,0 % and ensures fully automatic unmanned operating and permanent automatic diagnosis of its condition. There is also control and power switchboard mounted at the unit. The heat equipment includes exhaust silencer and anti-noise canopy.

Financial resources and partners

The overall project costs are about 335 000 Euro of which the price of the CHP unit is about 320 000 Euro. The rest is the costs of necessary construction works and of testing, tuning and commissioning of the unit. These costs are covered with factory's own funds.

Sofia Energy Centre undertook the promotion and dissemination of information about the success of the project within OPET CHP/DH project activities.

Results

The calculation at current prices of electricity, heat and natural gas in Bulgaria show the following main results of project economic evaluation at 6000 operational hours/annum:

- Annual profit from the CHP installation– about 105 000 Euro;
- Simple payback - about 3 years;

Investment payback would go to about 4 years at leasing conditions. It is evident that presuming project lifetime of about 20 years (equipment life-time given by the manufacturer with two major overhauls) the profitability of the SSCHP project is very high provided that the company keeps stable



market share and economic and financial performance. It will additionally increase in view of expected energy price increases till 2005 when they will be fully liberalized and market-determined.

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.

Further more, as mentioned above, the profitability of this type of project will additionally increase with further energy price increases so it can be expected that SSCHP in Bulgaria will gain much wider market positions compared to present and will get closer to present EU member-state levels.

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