

Micro-CHP Unit in an apartment house

Residential / Building

Main CHP project indicators

Heat capacity (total)	kW _{th}	12
Electrical capacity (total)	kW _{el}	4,5
Technology	Internal Combustion engine	
No. of units	1	
Manufacturer	ECOPOWER	
Type of Fuel	Natural gas	
Heat: yearly generation	MWh	38,5
Electricity: yearly generation	MWh	14,5
Year of construction	2010	
Total investment costs	EUR	25,000
Financing	Own funds	
State support	none	
Location	Thessaloniki, Greece	
Information	www.moumtzis.gr	

Picture



General description of the case

The case study is dealing with the total replacement of the central heating system of an apartment building, which was erected in 1964, with 9 level and 18 apartments. The old heating system was a dual pipe central heating system, which used heating oil. The total power of the old system was 250 kW_{th} and it was over-dimensioned, as this was a common practice in most of the apartment buildings in Greece, constructed the

previous decades. The old system was replaced by a micro-CHP system, producing electrical power of 4,5 kW_e and thermal power of 12 kW_{th} and the heating fuel is, now, natural gas. A boiler of 50 kW_{th} was connected to the CHP system and is used as “back-up”, as well as two thermal storage tanks of 1.000 liters each, connected in parallel. So during its operation the CHP unit was heating up the water, stored in the two thermal tanks and from these tanks the heated water was circulating in the piping and the radiators.

Success factors

Regarding legislation and pricing, the Greek Law for the promotion of CHP (L.3734/09) is favourable for micro-CHP units, giving priority to the cogenerated electricity to the network. Also, the local natural gas companies are providing favourably prices for natural gas for micro-CHP systems. Regarding the project itself, the annual consumption before the investment, was 14.000 liters of heating oil for the heating period 2009-2010. Then, the annual consumption of CHP system is 12.200 m³ of natural gas, while it also produces 14.5 MWh/year, electricity that was injected in LV network system, for the heating period 2010-11. The annual costs for 2009-10 were 17.000 € with the previous system, which were reduced to 8.655 €, if you take under consideration the economic benefit from electricity produced. The annual working costs of the system were decreased by 51 %, and the return on investment period is calculated to 3 years.

Main barriers

The main barrier for the promotion of micro-CHP, for both the tertiary and residential sectors, is the absence of an agreement between cogenerator and the DSO.

Conclusions

All the owners of the apartment building are very satisfied with their investment and are willing to suggest such systems to others. This is due to the fact that beyond the lower heating expenses, the indoor thermal comfort was increased, as the heating system is now operating continuously, due to the fact that the micro-CHP unit is heating up the two thermal storage tanks and not directly the apartments. If the above-mentioned barrier is solved, then there is a great possibility of similar projects in all areas where Natural Gas is provided.