

# Granada Luxury Belek hotel

## Antalya Turkey



Thanks to their large consumption of electrical and thermal energy, hotel resorts are an optimal place for the installation of CHP units as a local energy source. This is doubly true if such a resort, provides another energy-intensive service for its guests (wellness, conference hall, etc.). Thanks to the combined production of power and heat, the cogeneration technology has great potential to reduce energy costs in this type of operation.

In addition, the installation of a CHP unit increases the hotel's independence from the supply of power from the grid, and by doing so, contributing to the overall comfort of its guests. The hotel provides its services 24 hours a day and often there is a sudden increase in consumption, for example, when guests arrive or during social events. Cogeneration is sufficiently flexible in this respect and it can easily cope with these obstacles.

### About the project

The Granada Luxury Belek Hotel in Turkey is located on a plot of land with a total area of more than 100,000 m<sup>2</sup> and can accommodate up to 5,000 guests. With a size of 12,000 m<sup>2</sup>, the hotel resort also has one of the largest outdoor swimming pools in Europe. The energy consumption is therefore enormous here, especially in the summer months when the power is also needed for the operation of the air conditioning system. The hotel was built in 2017 in the Turkish city of Antalya and its total annual consumption of power amounts on average to 14,255 MWh while the heating and hot water require approximately 12,355 MWh. Energy costs amount on average to 1,275,000 € per year. The transition to cogeneration technology was not only a way to save energy costs for this type of operation, but it was also an opportunity to significantly reduce its environmental burden.



**5x 200 kW**  
electrical output

**5x 250 kW**  
heat output

**230 000 €**  
saved per year

**2 510 tun CO<sub>2</sub>**  
saved per year

# Solution for cogeneration

Instead of one large unit, we opted for a more flexible combination for service: 5 TEDOM CHP units with a total electrical output of 1,000 kW<sub>e</sub> are located in a separate building next to the transformer and the high-voltage switchboard. Due to the extreme climatic conditions in the summer months (temperatures exceeding 40°C, air humidity over 90 %), an additional cooling system is installed in this building to reduce the indoor air temperature below 35°C and keep its humidity below the limit of 80%. Furthermore, stronger and more durable ventilators were installed in order to ensure a generally better air flow. All this is to ensure the optimal operation of the CHP units.

## Current situation

The current solution is designed so that the CHP units are in operation all year round only with necessary service breaks. This brings maximum utilization of the cogeneration technology with an emphasis on efficiency. During the year, cogeneration covers approximately 57% of the total power consumption and 75% of the total heat consumption of the entire resort. Thanks to the implementation of the CHP units in its energy system, the hotel saves approximately 230,000 € per year which represents an 18% savings compared to the previous solution. At the same time, the hotel saves 2,510 tons of CO<sub>2</sub> per year compared to the previous situation.



### Installed CHP Units

|                   |                        |
|-------------------|------------------------|
| CHP unit type     | 5x TEDOM Cento 200     |
| Fuel              | Natural gas            |
| Electrical output | 5x 200 kW <sub>e</sub> |
| Heat output       | 5x 250 kW <sub>t</sub> |
| Total efficiency  | 88.7 %                 |



## Similar references

TEDOM has many years of experience in the use of cogeneration in hotels. In its 30 years of operation, TEDOM has delivered more than 210 applications to 23 countries around the world. In Turkey, all hotel projects were developed and implemented by our Turkish partner, Arke Energy Systems, with whom we have been cooperating since 2005. Together, we have put into operation more than 40 CHP units with a total output of 22,900 kW<sub>e</sub> during that time.

## About Cogeneration

Cogeneration is the combined production of power and heat. The biggest advantage of cogeneration is the highly efficient utilization of the energy in the fuel, which amounts to more than 90 %. Cogeneration brings savings in fuel sourcing and significantly reduces the amount of CO<sub>2</sub> emissions.

As compared to conventional power plants, where heat generated during the production of electrical energy is usually wasted into the atmosphere, the same heat is utilized by the CHP units for heating which makes the production of electrical power a great deal more efficient.

Due to their flexibility, these CHP units are also convenient complements to renewable energy sources during periods without solar radiation or wind.