

MedClean Propre Limpio



No. 126

Pollution prevention case studies

Energy efficiency

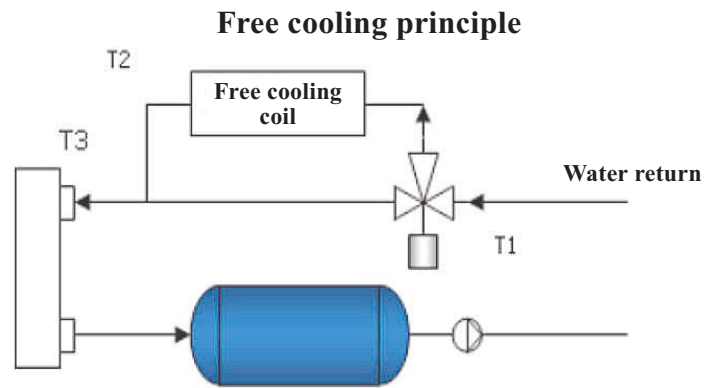
Company	NH Hoteles - Príncipe de Vergara Hotel (Madrid, Spain)
Industrial sector	Short term accommodation activities ISIC Rev 4 n. 5510 (<i>International Standard Industrial Classification of All Economic Activities</i>)
Environmental considerations	<p>NH Hoteles enhances ecological and environmental approach throughout the entire business cycle.</p> <p>NH Hoteles works continuously for the rational use of energy while maintaining the smooth operation of the building, carrying the consumption of resources to a balanced level and promoting the use of renewable resources. Since 2003, NH Hoteles monitors the energy consumption in all of their 394 hotels, developing specific energy efficiency programmes.</p>
Background	<p>Following the comprehensive refurbishment of its facilities, NH Hoteles recently reopened the Príncipe de Vergara Hotel. This emblematic hotel has adapted all of its rooms to the 'stay green' model developed by NH and awarded the European "Hotel Design Award".</p> <p>During its refurbishment, NH Príncipe de Vergara Hotel retained only the facade and the beams of the structure, which gives an idea of the extent of the work carried out. NH Hoteles took advantage of the refurbishment to incorporate the latest in energy efficiency technology.</p>
Summary of actions	<p>The company has installed two chillers that incorporate various energy-saving technologies.</p> <p>One of the new chillers has a total heat recovery system, which consists in transferring the heat dissipated by the chiller to preheat the sanitary water. The basic operation of this equipment is as follows: the chiller has an ancillary condenser designed for 100% of the load, which circulates the coolant before reaching the heat dissipation condenser. Through the auxiliary capacitor, the condensation heat is transferred to the sanitary water circuit of the hotel and stored in two preheated water tanks with a capacity of 3,000 l each. With this system, which operates during the five warmest months, the hotel obtains almost all its sanitary hot water.</p> <p>The other chiller is designed with free cooling technology, which can take advantage of low outdoor temperatures, for example in winter, to produce chilled water with little power consumption.</p> <p>The chiller has two coils, one for the refrigerant and one for ancillary water. When the outside air temperature drops to a set value, the unit starts to divert flow to the ancillary water coil and, therefore, chilled water is produced practically for free. If the outside temperature is not low enough to chill the water, an ancillary compressor will condition the required chilled water.</p> <p>Therefore, during the coldest months, guest rooms and common areas are conditioned by the free cooling system, resulting in almost 100% savings in electricity consumption, which is about 4.55 t CO₂-eq/year.</p>

Summary of actions (cont.)

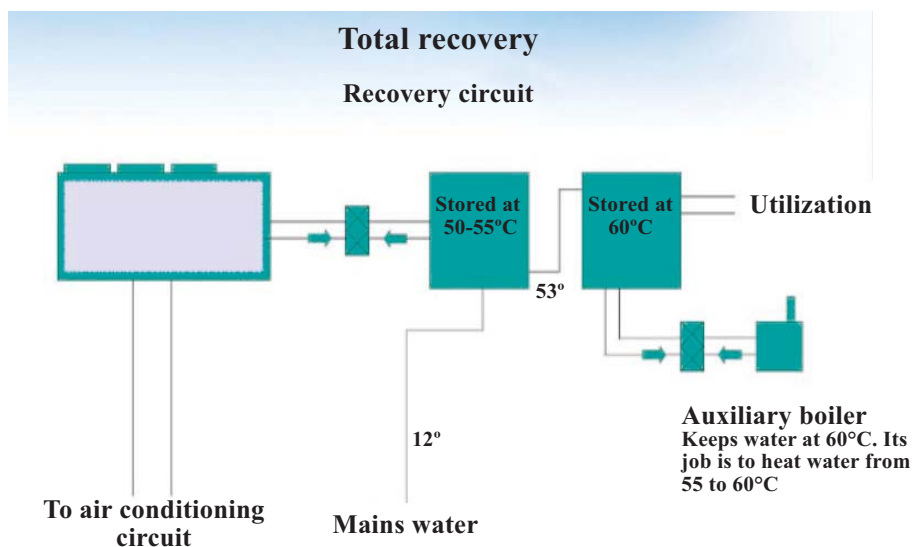
Equipment units installed:

- 2 air conditioners with energy recovery (air conditioning of rooms and common areas).
- 1 chiller with "free cooling" technology.
- 1 chiller with total heat recovery for sanitary hot water production.

Diagrams



AC system with energy recovery unit



Balances

Vector	Initial consumption	Final consumption	Investment	Cost savings	Payback period
Energy consumption	808,075 kWh/year	674,364 kWh/year	€120,000	€6,000 (approx)	5 years (*)

(*) Estimated based upon an extra cost of 25,000 Euros for incorporating such energy-saving systems into standard equipment.

Conclusions

The installation of the new equipments resulted in significant energy savings, which represents approximately 15% of consumption in kWh per year, equivalent to 49 t CO₂-eq.

On the other hand, this technology avoids the use of refrigerant R-22, an ozone-depleting substance and is present in old appliances, thereby reducing risks and problems in terms of controlling accidental releases and surcharge monitoring imposed by Spanish Royal Decree 795/2010 of 16 June on fluorinated gases.

In view of the results, NH Hoteles has decided to incorporate this air conditioning system in all their new hotels.

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.



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