



# CASE STUDY



## THE ROAD TOWARDS DECARBONISATION FOR THE HOTEL MELIÁ CASTILLA

### TECHNOLOGY USED

- 2 x 30XW--0452
- 1 x 30XW-H0552
- 1 x 61XWH-03ZE

### BENEFITS OF THE SOLUTION

#### SUSTAINABLE

This solution reduces fuel and electricity consumption in addition to their associated emissions.

#### INTEGRABLE

This solution can be applied with no need to shut down the installation.

#### SCALABLE

Equipment can be added gradually.

#### RELIABLE

Proven technology with many years of experience.

#### PROFITABLE

Increased energy efficiency means reduced operating costs.

### CO<sub>2</sub> EMISSIONS AVOIDED

**600 tons of CO<sub>2</sub>/year**

### An iconic hotel in the centre of Madrid

Located in the financial district of Madrid, the Hotel Meliá Castilla is one of the city's most iconic hotels, spanning over 70,000 m<sup>2</sup> and boasting 909 rooms. This city hotel enjoys a high occupancy rate all year round. These characteristics mean that the energy requirements of the hotel are very high, mainly due to the production of heat and cooling.

A few years ago, the management agreed a project to refurbish the thermal installations, focusing on sustainability, to reduce energy consumption and CO<sub>2</sub> emissions into the environment. This would also enable them to reduce the associated operating costs.

After defining the hotel's desired sustainability objectives and analysing the various potential energy-saving areas, the project was planned in different stages to ensure business continuity for the hotel.

*"With this solution, we have achieved the project's main objective: to reduce the carbon footprint significantly, by shutting down the boilers from June to the end of October."*

**Victor Retamosa**

Head of Technical Services  
Hotel Meliá Castilla

### Maximum Seasonal Efficiency

The first stage involved replacing the existing water-to-water chiller units, used for cooling, with other similar units offering greater seasonal energy efficiency.

The chosen units were equipped with screw compressors with a variable-capacity valve used to perfectly adjust the cooling capacity to the actual demand of the installation. Thanks to their compact design, these units could be incorporated into the building without major complications.

Additionally, one of the chillers would be equipped with a condensing heat recovery function. This unit, which will function as the first stage in the cooling production process, will enable the domestic hot water in the hotel to be heated up to 50 °C, reducing the energy consumption of the business due to its existing boilers.

This configuration provides a stable source of controlled hot water and a base load of cold water, improving the overall efficiency of the system.



## A heat pump: the key component for decarbonising a hotel installation

The next stage of the project involved incorporating a heat pump capable of producing water at high temperatures to minimise fuel consumption in domestic hot water production.

This heat recovery unit is sized according to the base heat demand of the installation, and is installed in parallel with the rest of the chilled water production units. To make optimal use of this equipment, it is key that there is simultaneous demand for cooling and heating over a long period of time.

Some of the most important aspects to consider when designing this heat recovery solution using dedicated water-to-water units concern the location of the new production equipment, assessing the electrical and hydraulic connection to the existing loop, checking the volume of water available in the installation and incorporating the units into the existing control system, where applicable.



### AquaForce 61XWH

These units use HFO refrigerant with a negligible global warming potential (GWP <1 under AR5) and ozone depletion potential value of zero (ODP = 0). The equipment incorporated in these units includes: a Carrier twin-rotor screw compressor featuring a high-efficiency motor; a variable-capacity control valve which enables the heating generation capacity to be exactly matched to the demand of the installation; flooded multi-pipe heat exchangers to increase heat exchange efficiency; and an electronic expansion device that enables optimal use of the evaporator heat exchange surface.

The compact design of these units was key to its introduction and installation in this hotel, as this equipment could fit through standard-size door openings and the units occupy limited space on the machine room floor. The units are also quick to commission as they are factory-tested prior to shipment and feature a specific function for step-by-step verification of the instruments, expansion devices and compressors.



### A reference project

“This installation is the perfect case study on how to roll out a decarbonisation project in the hotel sector. The combination of technologies – in particular, the use of AquaForce water-to-water heat pumps, specifically designed to generate hot water at high temperatures with excellent energy efficiency as the two heat sources of the equipment are used – have helped us take a huge leap forward on the road towards decarbonisation for this hotel.

The measures put in place in this thermal installation have resulted in a very considerable reduction in CO<sub>2</sub> emissions due to reduced fuel consumption, especially during the summer months, and an increase in the overall energy efficiency of the production plant. This reduction means lower operating costs, making the hotel much more competitive.”

**Miguel Nájera**  
Marketing Manager  
Carrier España

