

Cooling system in office buildings – RATP (Paris)

CONCEPT

To cool the computer server rooms of its main office building in Paris, RATP used to take deliveries of ice water from an external company. The production of ice water proved to be costly and consumed a lot of energy. The project involved installing a new chiller to cool the server rooms. The chiller can also preheat the building in winter.

SUPPLIER

Cooling system:
AIR ET ENVIRONNEMENT

OBJECTIVES

- Avoid the delivery of ice water to cool the computer rooms;
- Decrease the energy consumption related to the cooling of the computer rooms;
- Recover the heat of the chiller to preheat the building and to preheat domestic hot water for showers.

INVESTMENT DESCRIPTION

The investment consists in implementing a high-performing cooling system to cool the computer rooms of the RATP headquarters. The main goal is to avoid the delivery of ice water from the external company CLIMESPACE. The production of ice water proved to be costly and consumed a lot of energy with subsequent CO₂ emissions. In order to produce ice water, the cooling system generates a large amount of heat. This heat is recovered to preheat the steam used to heat the 56,000 m² of offices. This allows substantial energy savings during the winter. In addition, the excess heat generated by the chiller also serves to preheat domestic hot water for showers on site.

COST AND FUNDING

The cost for the cooling system is around €450,000. This includes the procurement, the installation works and the calculation of the energy savings by the use of the IPMVP protocol.

RESULTS

The real savings have been calculated by using the IPMVP protocol, which defines the methodology for calculating the energy use before and after the implementation of an energy-saving investment. In this case, the energy savings are based on the following calculation:

$$\begin{aligned}
 &\text{Energy savings for not supplying ice water} \\
 &+ \\
 &\text{Energy savings from heating recovery} \\
 &- \\
 &\text{Energy consumption of the cooling unit}
 \end{aligned}$$



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Results	
Investment costs (€)	€450,000
Energy savings (%)	9%
Annual energy savings (kWh)	1,600,000kWh
Annual CO ₂ savings (TCO ₂)	125 TCO ₂
Annual cost savings (€)	€105,000
Payback time (years)	4-5 years

Measurements of energy consumption were taken before and after the implementation and then compared. The project showed an energy use reduction of around 24%. This system allowed 9% energy savings of the total energy consumption of the RATP headquarters building. Financial savings correspond to the volume of ice water that is no longer supplied plus the savings in terms of heating minus the energy costs of the cooling unit. They amount around €100,000 for one winter period.

LESSONS LEARNED

This investment enabled RATP to upgrade the global cooling system of its headquarter, even using a classical equipment. The idea was to use a classical cooling system in a innovative way so that it becomes a global environmental performant solution. Reusing the heat produced by the chiller was definitively the good idea. The results are beyond expectations.

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