Building with centralised hybrid system, Italy

F1.5

Refurbishment in climate zone E with heating, air conditioning and hot water system

Key facts

Buildings

Location	*Milan, Italy*
Construction	*year of construction 1960*
Project type	*refurbishment*
Year of	*2024*
Heat distribution	*radiators*
Heated space	*6500m²*
No. of apartments	*53*
Level of insulation	*medium thermal insulation*

Heat pump and source

Number of	*2*
Heat source	*ambient air*
Installed power	*186kW*
Cooling HP	*1 water chiller 166kW*

Heating and cooling system

Additional heater	*390 kW support heat boiler*
Heating temperature:	*supply water at 58°C*

Domestic hot water

Type of system storage tank	*Centralized system*

Other information

Refrigerant	*R32*

Lesson learned

- The heat pump system has proved to be an excellent solution for improving the building's energy efficiency, even in combination with a building envelope that is not particularly performing and maintaining the old heating and cooling distribution system.

Located in the centre of Milan, the 1960s building consists of 53 flats covering a total of 6500 m2. The building had undergone an initial complete renovation in 2000, which also involved the building envelope. Heating was provided by two traditional boilers for heating and domestic hot water and two chillers for summer cooling. The distribution of heat and cold was done with radiators and fan coils, respectively.

Requirement: In 2023, it was decided to improve the building's energy performance by intervening on the air conditioning system, but with the need to maintain the present distribution system.

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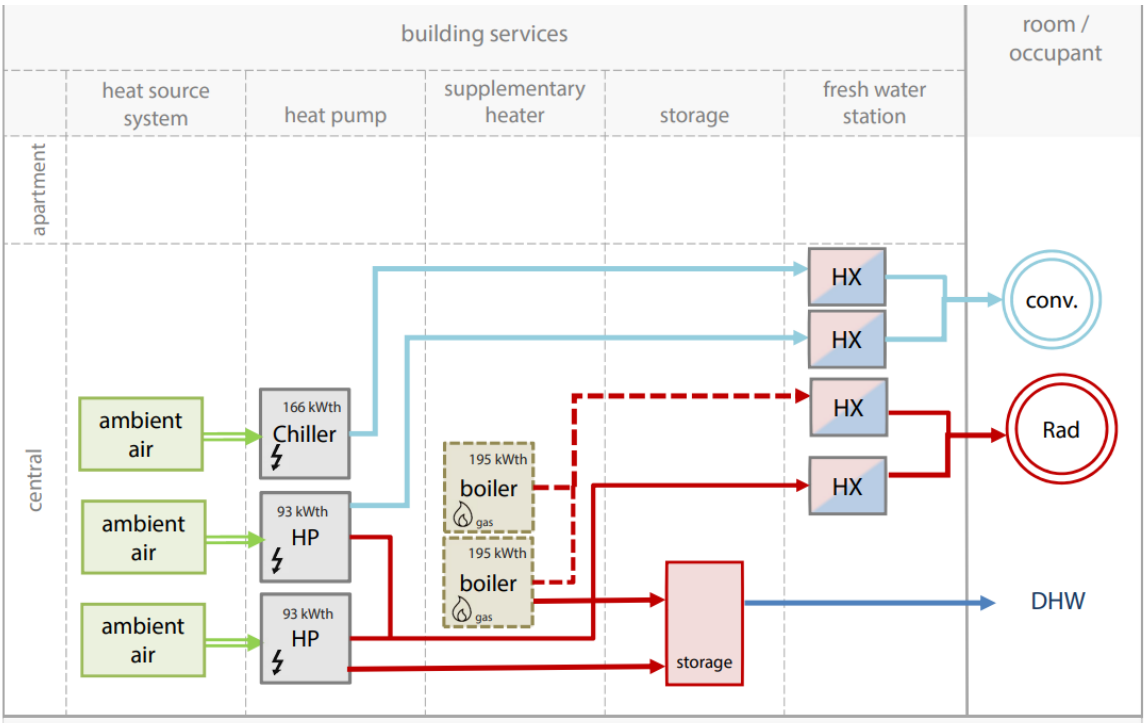
Technical details



Multiple (cascade) centrilized HP system with back-up boiler and chiller for AC

Largo La Foppa (Milano-Italy), Clivet S.p.A

Two central HPs and one "heat pump" that solely has a cooling function, supported by boilers.

Description of the technical concept

The two existing boilers were replaced with 2 high-efficiency heat pumps with inverter technology and ecological refrigerant R32 Sheen EVO 2.0 and 2 condensing boilers of 200 kW, which are used as back-up and integration in situations where high temperature water is required. The heat pumps can also be used as a back-up to the chiller in peak cooling demand.

To replace the 2 old chillers, a high-efficiency chiller with Magnum WSAT-XEM was installed.

The entire system is managed by Clivet's INTELLIPLANT Building Management System, which coordinates the entire heating and cooling plant, activating the plant resources according to the thermal demand received from the individual flats and always activating the most efficient resource, has made it possible to operate the heat pumps in conjunction with the gas boilers, thus providing a perfectly reliable and efficient hybrid system. Intelliplant also makes it possible to maximise the total performance of the system by making the units work at their maximum efficiency and allows the customer to monitor thermal, cooling and electrical consumption.

The system allows for constant monitoring and therefore prompt intervention at any time or in the event of faults or failure.

Installed models:

- HP: Sheen EVO 2.0
- Cooling: 1 Magnum WSAT-XEM chiller
- Control: INTELLIPLANT system