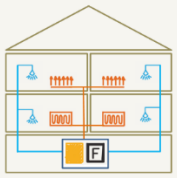
Building with centralized plant turned hybrid, Italy

Refurbishment of existing building – From Class C to Class A



A5

This project oversaw the energy requalification of a 107-apartment condo

Key facts

Buildings

Location	*Milan, Italy*
Construction	*Early 2000s.*
Project type	*retrofit*
Heat distribution	*Radiators + Fan Coil radiators*
Heated space	*10,000 m²*
No. of apartments	*107*
Level of insulation	*high thermal insulation*

Heat pump and source

Number of	*6 air-water* 2 water-water
Operation mode	*bivalent, cascade*
Heat source	*Air, water*

Heating system

Heat demand or installed power	*680 kW (HPs) + 1200kW (boilers)*
Heating temperature	*65°C*
Type of system	*central*

Domestic hot water

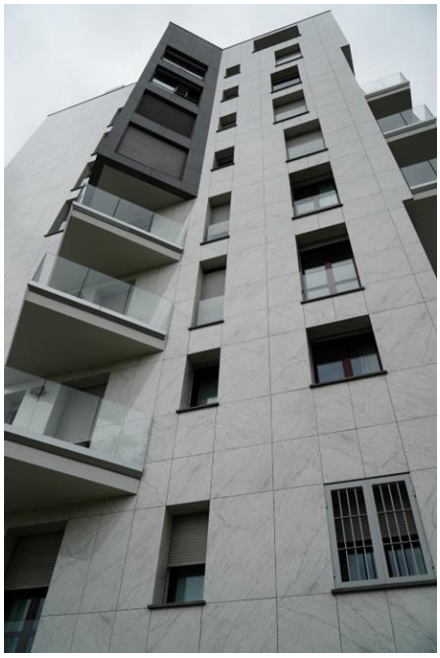
Max. temperature	*65°C*

Other information

Coefficient of Performance	*6 x 3.23* *2 x 6.46*
Refrigerant	*R410A*

Lessons learned

- By exploiting multifunctional technology combined with the high temperature heat pumps, it is possible to produce DHW above 65°C without using the boilers.
- Thanks to the management system implemented by Clivet Intelliplant it is possible to run boilers in combination with heat pumps, thus providing a perfectly reliable and efficient hybrid system for every eventuality.



The upgrade from Energy Performance Certificate **C** to a level **A** wade made possible by equipping the building with thermal insulation and replacing the existing heating systems with a complete Clivet system based on multi-purpose heat pumps, high temperature water-water heat pumps, boilers and the *Intelliplant* comfort and energy management system.

The challenge for this building with eight above-floors and one basement floor with a total of 10,000m² was to improve the energy efficiency of the apartment building, reduce heating, air conditioning and hot water costs, and increase the building's energy class. The existing distribution system was to be maintained.

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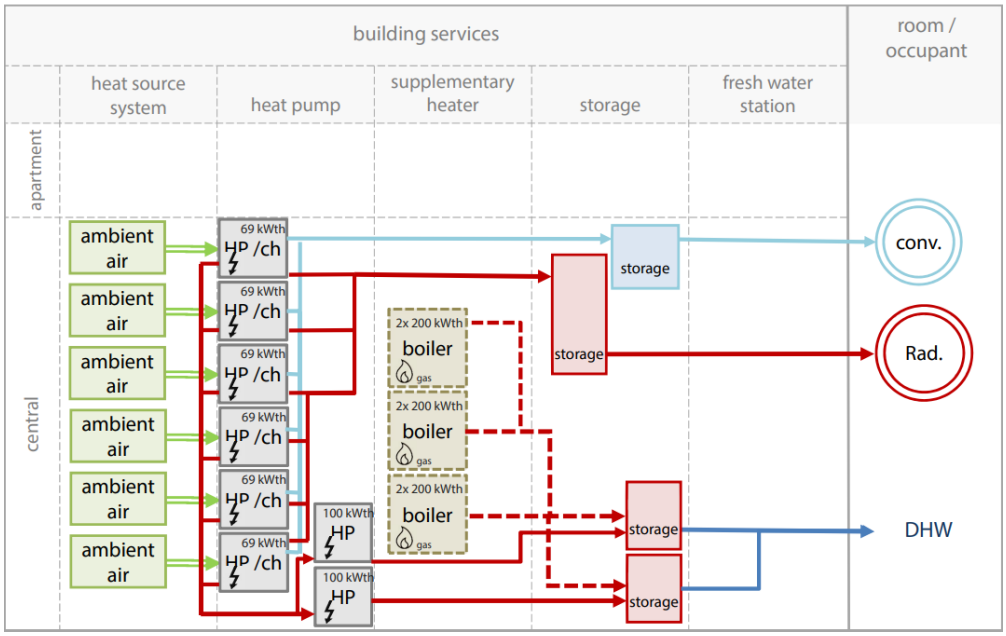

Multiple centralized HP systems and booster HPs for Air Conditioning (AC) with back-up boiler

Via Cervignano (Milano-Itlay)
Clivet S.p.A

Description of the technical concept

The condominium was served by a centralized system based on three old gas boilers and radiators for heating and domestic hot water production and two large chillers with cooling towers installed on the roof, combined with fan coils.

To meet the challenge, interventions were made both on the building envelope, providing the condo with thermal insulation and replacing the old windows with low-transmission windows; and on the heating and air-conditioning system, replacing the existing system with a complete hybrid system made by Clivet. The existing radiators, fancoils, and internal regulation and metering system were maintained.

The new installed system consists of:

- 6 ELFOEnergy Magnum WASN-XIN polyvalent heat pumps of 80kW, each capable of producing hot and chilled water simultaneously
- 6 boilers of 200 kW
- 2 ELFOEnergy Ground Medium WSHH-LEE1 100 kW high temperature water-to-water heat pumps
- 3 x 2000l storage tanks for summer cooling
- 2 x 2000l storage tanks for heating
- 2 x 2500l storage tanks for DHW, each equipped with two exchangers, which exchange respectively with the high temperature water-water HPs and the boilers, which only intervene in the event of greater demand
- 1 Clivet Intelliplant management system

The six multi-purpose HPs produce the hot water for the storage tanks, which act as a source to serve the high temperature HPs. During most of the year, when there is a similar demand for heating and cooling, hot and cool water can be produced simultaneously and hihgly efficiently.
DHW is produced by using the hot water of the mutlifuntional HPs, thus not using ‘outside’ water. Taking advantage of the multifunctional technology, combined with high temperature HPs, it is also possible to produce domestic hot water at temperatures above 65°C without using a boiler. The system is completed with six boilers which can work in integration in the case of high heating demands, or in total replacement in the case of heat pump maintenance.
Due to the *Intelliplant* supervision system, it is possible to run heat pumps in combination with boilers.