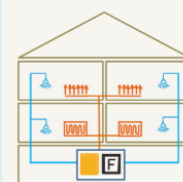


Hybrid Heat Pumps with Solar Thermal Collectors for DHW Production, Italy

Refurbishment of a 150-apartments building in Milan


A5

Key facts

Buildings

Location	<i>Milan, Italy</i>
Construction	<i>1970</i>
Project type	<i>Retrofit</i>
Heat distribution	<i>Radiators</i>
Heated space	<i>10,000 m²</i>
No. of apartments	<i>150</i>
Level of insulation	<i>Good</i>

Heat pump and source

Number of

4 SHEEN EVO 2.0 heat pumps

4 gas boilers

4 solar thermal collectors

1 INTELLIPLANT management and monitoring system

Heat source *Air*

Heating system

Installed power *360 kW with heat pumps and 800 kW with gas boilers*

Heating temperature *55°C*

Domestic hot water

3 storage tanks:

750 liters connected to the solar plant

750 liters connected to one heat pump

1500 liters connected to one gas boiler

Max. temperature *70°C*

Other information

COP *3.36*

Refrigerant *R32*

Lessons learned

•The heat pump system combined with storage tanks and thermal solar collectors have proved to be an excellent solution for improving the building's energy efficiency and cut down the costs for domestic hot water production.



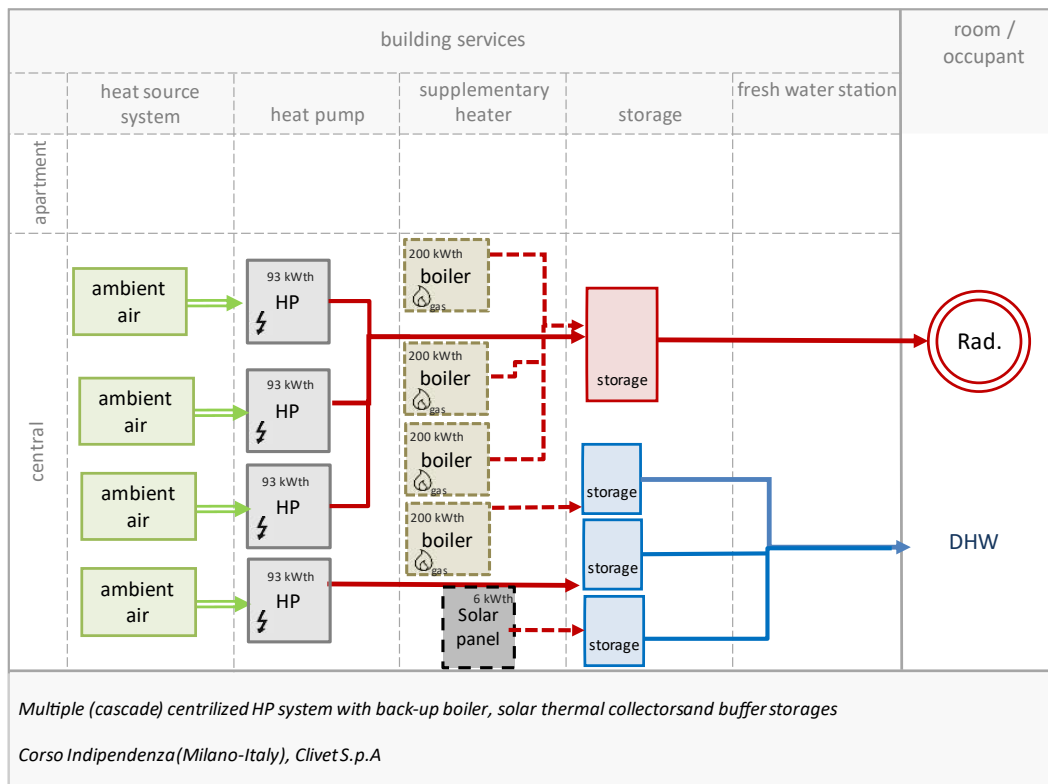
The energy retrofit project in Milan, Italy, concerns a 1970 residential complex with 150 apartments and 10,000 m² of heated space. Using radiators and benefiting from good insulation, the building's energy system efficiency has been improved.

The upgraded heating system combines 4 air-to-water SHEEN EVO 2.0 heat pumps, 4 gas boilers, 4 solar thermal collectors, and an INTELLIPLANT management system for optimized performance of the system. With 360 kW from heat pumps and 800 kW from gas boilers, space heating is provided at 55°C.

DHW production is supported by three storage tanks, reaching up to 70°C, using the heat pumps, the solar thermal collectors and the gas boiler.

Achieving a Coefficient of Performance (COP) of 3.36, the system uses R32 refrigerant for lower environmental impact. The integration of these technologies has enhanced energy efficiency and reduced costs, particularly for domestic hot water production.

Hybrid heat pumps with solar thermal collectors, Italy



The hydraulic scheme indicates that four air-to-water heat pumps are used to supply space heating to the building, where the apartments are equipped with radiators. Boilers serve as auxiliary heating systems. Additionally, a solar thermal panel field assists the heat pumps in domestic hot water production.

Description of the technical concept

The heating demand for the apartments is met by a combination of two different hybrid systems.

The radiators are supplied through a thermal storage tank filled with technical water, whose required temperature level is maintained by three-high efficiency heat pumps. Additionally, three gas boilers serve as backup heaters.

The domestic hot water (DHW) production is managed at three different temperature levels. First, water is preheated using the solar thermal collector field. It then flows into a second tank fed by a heat pump dedicated to DHW production. If needed, the final temperature adjustment is provided by the gas boiler.

The entire system is monitored and controlled by Intelliplant, which optimizes the plant operation by selecting the best heat source input based on solar radiation availability and the required temperature level to be supplied to the user.

