

## Daru, Geneva, Switzerland

This project concerns the replacement of an existing gas heating system by a hybrid HP+gas solution in an existing multifamily building. With the goal of having the maximum annual heat production from HP origin, six air/water heat pumps were implemented on the rooftop. One of the previous gas boilers was kept for the peak loads in winter.

### Key facts

#### Building

Location	<i>Geneva, Switzerland</i>
Construction	<i>1992</i>
Heated area	<i>7'563 m<sup>2</sup></i>
Level of insulation	<i>low (1992 standard)</i>

#### Heat pump

Heat source	<i>ambient air</i>
Number of HPs	<i>6</i>
Installed power	<i>6 x 30 kW HP (A2/W50)</i>

#### Heating system

Operation mode	<i>hybrid (HP + gas)</i>
Existing gas boiler	<i>240 kW</i>

#### Heat demand

<u>Space heating</u>	<i>700 MWh/yr (71% of demand)</i>
Heating temperature	<i>60 °C (@ -7° ext)</i>
Heat distribution	<i>radiators</i>
<u>Domestic hot water</u>	<i>(39% of demand)</i>
Type of system	<i>centralized</i>
Max. temperature	<i>60 °C</i>
Circulation system	<i>yes</i>

#### Other information

Electricity cons.	<i>190 MWh/yr</i>
Gas cons.	<i>230 MWh/yr</i>
Investments costs	<i>unknown</i>
PV installation	<i>no</i>

#### Lessons learned

Ongoing monitoring, but so far:

- Major air HP constraints encountered: noise emissions, vibrations, safety... These implied important costs and planning work.
- Hybrid HP+gas system: optimization of the gas boiler switching point is crucial for a good HP share in the overall heat production (specially with an old boiler without variable power output).
- The constraints of the old heat and DHW distribution system should not be underestimated.

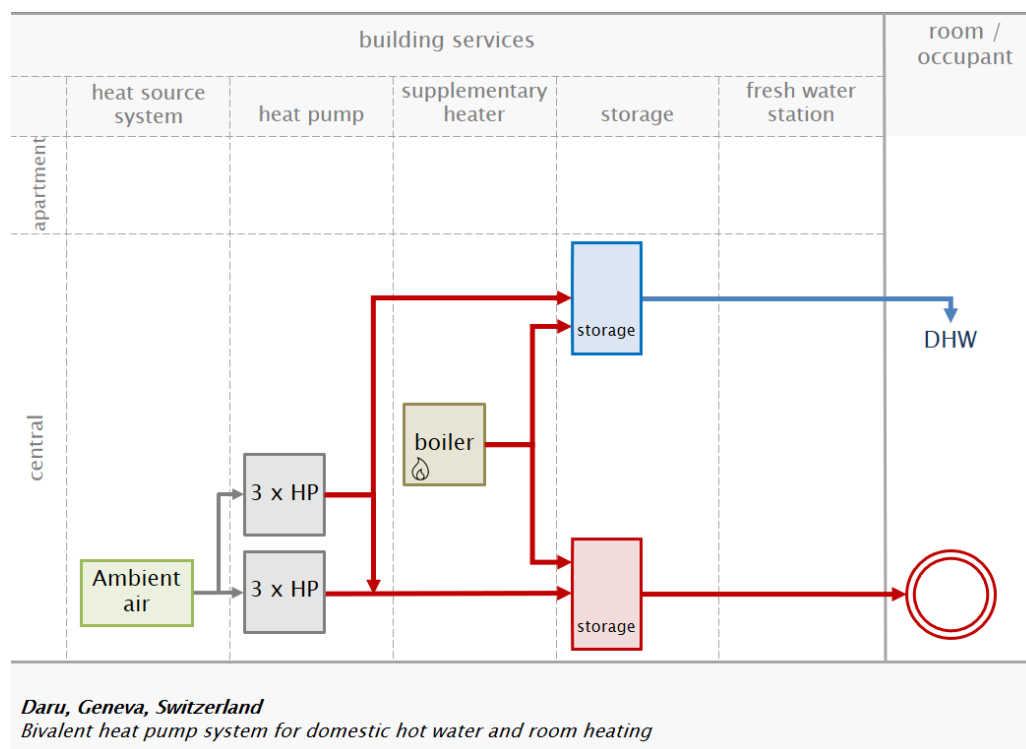


The existing MFH (multi-family building), built in 1992 in Geneva, contains 68 apartments, within 4 floors, plus commercial establishments on the ground floor (restaurant, bakery, ...). It suffered no major envelope retrofit before this project and the total gas consumption amounted to 1'000 MWh/yr (for space heating and domestic hot water of 7'563m<sup>2</sup>). (Photo credit SIG, CSD Ingénieurs SA)



**Daru, Geneva, Switzerland, Technical Details**

## Hydraulic scheme of the system

**Description of the technical concept**

This project, part of a Geneva pilot program to replace fossil fuel boilers by heat pumps (HP) in MFH, concerns the replacement of a gas heating system by a hybrid HP+gas heating system. With the goal of having a maximum heat production from HP origin, six 30 kW air/water heat pumps were implemented on the rooftop. For the peak loads in winter, a 240 kW gas boiler was maintained.

It should be mentioned that:

- The building rooftop was retrofitted before the HPs were installed. No other retrofit action was undertaken.
- The heat and DHW distribution system was not modified.

The 6 HPs are divided into 2 groups of 3. 1 group exclusively for space heating, the other can either do space heating or domestic hot water. The gas boiler, when functioning, can work simultaneously with the HPs.