

PRIVATE HOUSE

Sedico, Belluno - Italy

Detached house

New Construction

ELFOSystem GAIA Edition

Year 2010



The new single-family house, for residential use and support to a commercial activity, is structured over three floors, one of which is underground.

It is located in a country area in the Northeast of Italy, in a zone with a mountain climate: cold winters and temperate summers.

The Challenge

The construction of the new house for the owners had the dual function of being their main residence and support to their greenhouse activity.

The owners required an eco-friendly solution and also had access to large quantities of wood. At first they were considering heating through wood chip boilers however the boilers were immediately rejected due to the enormous cost of the plant necessary for wood chip production.

Solutions using gas boilers were also rejected, because the area where the house would be built was not served by natural gas. Additionally the use of an LPG system would be expensive to operate and raised safety issues that would need to be resolved.

For all these reasons the owners required an alternative ecological solution, with sustainable construction costs, low energy consumption and was easy to install and manage.



Private house – Exterior views



The climate

- Mountain climate (3.043 degree days/Climatic area "F", according to Italian regulations)
- Winter project temperature -10°C

The building

- Built in 2009
- Detached house with three floors, one of which is underground, and annexed cottage.
- 6 rooms

The size

- 600 m² total

The team

- Plant realization A.G. Team (TN)
- Air conditioning system supply Agenzia Pizzolato

The solution

The solution adopted for air conditioning and domestic hot water production was Clivet ELFOSystem GAIA, a hydronic system based on heat pump technology.

The GAIA Aria heat pump, which includes a 200 liter integrated storage tank, contains all the system components required for the production of heating, cooling and domestic hot water for the whole house.

A hydraulic breaker was added to the plant in order to allow the heat pump to work at a flow rate fixed on the primary circuit. The secondary circuit, served by a variable flow rate pump, is divided into the three areas in which the building is composed: the ground floor, the first floor and the annexed cottage dedicated to offices, locker room for the greenhouse employees and storage area.

Each of the three areas is managed by an electro-thermal control for maximum energy savings.

The heat pump works constantly at the lowest idle speed of compressor and fan, thanks to the low water temperatures required by the radiant panels.

Heating and cooling distribution is made by means of floor radiant panels. Their performance in cooling operation is ensured by inside air recirculation dehumidifiers.

The results

The original requirements expressed by the owners for the heating of their house was fully satisfied with the added benefit of providing the summer air conditioning all via a single plant unit.

The ecological requirements were completely respected, providing a total and even comfort in all rooms regardless to the season, thanks to a system characterized by strong energy saving, high efficiency (seasonal average COP 3) and only indirect CO₂ emissions (generated by the electrical supply provider).

Both parts of the heat pump have been installed in the underground floor: the inside unit in a small technical room and the outdoor energy exchanger in the garage with hopper window ducting, granting minimal restrictions.

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For further information about Clivet systems:
www.clivet.com



Private House – Indoor heat pump unit and heat exchanger in the under floor

The system

- 1 air to water heat pump Clivet GAIA 61, with DC inverter technology driven compressor, integrated 200 liter storage tank and hydraulic breaker for heating, cooling and hot sanitary water
- Distribution: floor radiant panels

About GAIA

GAIA is the unit-system which integrates the main elements of a heating plant: components for the production of hot domestic water-including 200 liter storage tank - components for connection to solar panels and hydronic components. GAIA allows solar energy to be used in all its forms, both direct-captured through solar panels-and indirect, that is, stored in the air, water and ground, and captured using devices like heat pumps. By means of an intelligent control system and the use of these two forms of energy, GAIA guarantees all the system's requirements, independently choosing whether to draw from one source rather than another and always favoring minimum energy consumption and maximum efficiency.