PRIVATE HOUSE

Cartigliano, Vicenza - Italy

Detached house

New Construction

ELFOSystem System

Year 2008

A new single-family house structured over three floors, one underground, exclusively for residential use. Located in the Northeast of Italy, in an area with a continental climate of cold, damp winters and hot, humid summers.

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The Challenge

The commissioning customer's main objectives for the new house were very precise: ecological solutions and maximum comfort.

Low energy consumption systems, with zero direct CO_2 emissions and no gas supply.
This ecological spirit would have to involve all the domestic settings, from the cooker to the heating and air-conditioning.

In order to limit energy wastage, the building would have to be built using a high level of thermal insulation. Consequently, the need to manage the air and exchange quality arose, to avoid typical problems associated with closed environments, from stale air to mould.

Other than high qualitative standards, the property also required the installation of systems which were easy to manage, took up minimum space and included the smallest possible number of elements.

Private house – View from outside

The climate

- Continental climate (2,400 degree days / Climatic area "E", according to Italian regulations)
- Winter project temperature -5°C

The Building

- Built in 2008
- Detached house on 3 levels, one underground
- 13 rooms

The Size

- 267 m^2 in total

The team

- Plant design Tiberio Smaniotto
- Plant contractor Termoidraulica Marin
- Air conditioning system supplier Agenzia Pizzolato

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The Solution

A Clivet hydronic ELFOSystem was adopted in order to reach the set objectives in terms of air-conditioning and producing hot water for sanitary use.

The (cold, hot and sanitary hot water) system is based on air-to-water ELFOEnergy GAIA heat pumps, which include sanitary accumulation integrated with 200 litres and all the solar thermal connections. These latter are made up of four solar panels installed on the roof of the building.

The air quality is entrusted to an ELFOFresh ambient air refreshment unit. As well as guaranteeing air exchange, filtration and the correct level of air-humidity, this heat pump, which has an active thermodynamic recovery unit, also enables autonomous temperature management in spring and autumn without the use of the main heat pump.

The heating and cooling distribution is managed in two different ways in order to satisfy the differing needs of the building.

Distribution takes place using radiant ceiling panels for the ground and first floor, which are used on a daily basis. Their perfect working in the cooling phase is guaranteed by the de-humidifying air refreshment unit. ELFORoom reduced consumption convector fans were chosen for the underground level, which is only occasionally used, in order to rapidly reach the desired temperature when needed and maintain the comfort of the entire building.

Management of the system is entrusted to an ELFOControl centralised control device, which enables the various parts to achieve greater efficiency.

The Results

The whole system has enabled very high levels of comfort to be obtained with perfect temperature uniformity and high air quality in all parts of the house and in all seasons.

The ecological objective was also perfectly attained, in as much as the system is characterised by very great energy savings, coupled with high-energy efficiency (COP) and only indirect CO_2 emissions (limited to the production of electrical energy, for example, thermoelectric system).

The centralised control system enables energy to be used only when it is needed, where it is needed and in the quantity that is needed. The heat pump works at a constant minimum in terms of the compressor and ventilation turnover rate thanks to the low temperatures required by the water supplied to the radiant panels.

The energy data and calculations are accurately monitored by Clivet using a telemanagement system which is able to check that every single element is working on a daily basis.

The property, which has been lived in since November 2008, finished its first winter period with important service results, 35% lower costs in comparison with those associated with a similar system using a normal condensation boiler.

The main elements of the system are located within the heating system at the partially underground level, in order to respect the commissioning customer's space requirements, while its control device has been placed in the living area on the first floor to allow easier and faster management of the equipment.

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

Private house - Underground room with heat pump and centralised control device

The System

- An air-to-water Clivet ELFOEnergy GAIA 61 heat pump, with Inverter compressor technology, 200 litres of integrated accumulation and integrated connections to the thermal solar panels
- A Clivet ELFOFresh 5 air refreshment unit
- Distribution: the partially underground level with a Clivet ELFORoom OUT 11; the ground floor and first floor with radiant ceiling panels; bathrooms with heating furniture
- System control with Clivet ELFOControl
- Four solar panels

About ELFOSystem System

ELFOEnergy GAIA is a machine which integrates the main elements of a central heating system within itself, or rather the parts used in the production of hot water for sanitary use (including 200 litres of accumulation), the connections to the thermal solar panels, and the hydronic components.
Gaia permits solar energy to be used both directly via the solar panels, and indirectly by recuperating it from the air, water and earth. By using these two forms of energy, ELFOEnergy Gaia can also guarantee everything the system needs, by autonomously deciding which source is most suitable and always putting minimum consumption and maximum efficiency first

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