Low energy buildings - Case Study:

Farmhouse (passive house), Trezzo Tinella (Italy)

Category / year	New construction: nearly zero energy building or better - Small residential (1-2 family houses) / 2009-2010
Address	Trezzo Tinella (CN, Italy)

Contact details

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Pictures







Description of the building

Detailed description:
Single family detached house (about 400 m^2 of net floor area) meeting passive house standards. Built on the site of a demolished farmhouse, which was structurally compromised and had no historical or architectural value. The design goal was to build a residential building which is energy-independent, has zero CO_2 emissions and very low power requirements.

Building envelope:
The building consists of three linked parts. Each of these three parts uses different technologies / materials so as to test and compare them on the same site.

- *First part:* the main part uses the traditional double brick wall with cavity insulation. Insulation layer: 200 mm of STIFERITE GT PU boards to achieve a thermal transmittance (U-value) as low as 0.10 W/(m^2·K).
- *Second part:* the bioclimatic pavilion was built as a timber frame construction insulated by structural insulating panels placed outside the frame to avoid thermal bridges. The U-value of these walls is 0.09 W/(m^2·K) thanks to 250 mm of STIFERITE GT PU boards. The pavilion has a walkable green roof covered by a lawn. 200 mm STIFERITE GT polyurethane boards were used to achieve a U-value of 0.09 W/(m^2·K).
- *Third part:* incorporating the staircase, this was built with a metal frame and curtain wall dry slabs and cement fibreboard layers alternating with three polyurethane layers to achieve a thermal transmission of 0.08 W/(m^2·K). The outer timber is designed as a ventilated facade.
- *Windows:* internorm EDITION series wood / aluminium with U-value = 0.74 W/(m^2·K).

Renewables:
Two renewable energy systems are installed on the building roof: a photovoltaic electric plant and a vertical-axis wind turbine. Both systems are connected to the national electric grid and are sized to fulfill the energy requirements of all HVAC systems (auxiliary included).

Energy consumption

Energy values:

- *Heating demand:* 2 kWh/m^2/year
- *Cooling demand:* 0 kWh/m^2/year (passive cooling)
- *Final energy demand:* 30 kWh/m^2/year

Use of renewables:

- 100 % renewable (RES) fraction of the energy used for heating
- 100 % RES fraction of the energy used for hot water

Links

Websites illustrating the building:

- www.ediliosrl.it (work in progress)

Promotional material:

- About 1500 photos showing the building method will be made available on a CDrom