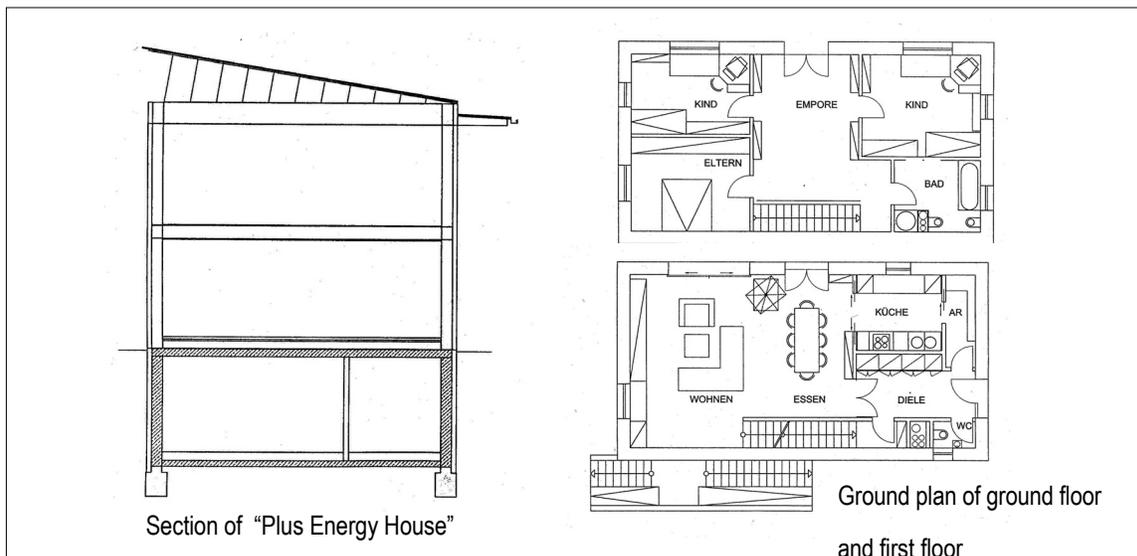


Plus Energy House in Thening, Austria





The project

It took only 6 months to build this cozy home for one family back in 2001. It is of the ecological Passive-house type and is made of pre-fabricated wooden components.

The building structure is compact and opens to the south. The northern part of the facade shows only the window for the toilet.

The open, horizontally fixed timbering made of larch wood, hides a perfect thermal insulation assembly.

DWD board, cellulose insulation and OSB board complete this wooden construction.

Building construction

Basement:

Floor surface: floor tiles 10mm

Screed: 60 mm

PAE Sheet

45/42 TSDP

Polystyrene: 100mm

Impermeable Concrete: 100mm

Gravel layer: 300 mm

Composition of ceiling:

Board made from wooden material: 22 mm

Ceiling beams made of bonded plywood: 320 mm

Inter-layer of Stone wool as thermal insulator 100 mm

PAE Vapor-barrier sheet

open form work: 24mm

Fiber reinforced Gypsum core board: 15 mm

Windows

Wood frame windows for passive house with 3-pane-glazing (manufactured by Sigg)

Wall construction

GKPL (Fermacell): 15 mm

Intermediate Installation level with 6 cm Flax insulation

Vapor barrier (Eco vapor barrier) OSB Board: 15 mm

TJI Carrier: 300 mm with intermediate Isocell thermal insulation (Cellulose) DWD

Board Ventilation gap: 50mm

Composition of roof:

Rubber sheet

RHEIN ZINK® Sheetmetal

Lining sheet for dew drainage (open to diffusion)

Open form work Ventilation

gap/rough from work: 24mm

Moisture Insulation of lower Insulation element with 110 mm wooden board with surface dressing

Wooden board 16 mm

Ceiling beams: Ply-wood board, with intermediate insulation 400 mm

PAE sheet as Vapor barrier

Open form work: 24 mm

Fiber reinforced Gypsum core board: 15 mm

The living area is equipped with energy saving lamps (CFL)
Total load for lighting: 460W



Inlet for living rooms, exhaust outlet and technical services



Technical systems

Modern technical services incorporate tested technologies, resulting in a well functioning Plus Energy house

The two-storey structure is fitted with a 17m² façade collector in the ground floor for the generation of warm water.

Mechanical ventilation with heat exchanger (efficiency: 85%) supplies perfectly filtered air and cools or heats, depending on the circumstances
Ecological house of wooden construction, built as passive house

Use of rain water for irrigation, toilets and laundry.
10,350 Wp photovoltaic modules which replace the roof are connected to the grid and produce electric energy.

Due to this technology and the design of the house, there is no need for a separate chimney.

The roof is not inclined towards the north as is usually the case, but its highest point is due north, and it has an angle of 10° to the south and thus, the photovoltaic module can be incorporated in the roof surface.

The solar modules from "Solar Fabrik" have a surface of 86m² and come from a CO₂-free production. Consumption of the house is only 1/3 of full capacity, with the surplus being sold to the power utilities and fed into the mains.

Energy performance

The house is heated by a controlled air supply for living areas with 85% thermal efficiency. An earth heat exchanger sucks air of currently 12 degrees centi-grade from the soil. The air is cleaned by 2 filters. It is then blown into the living rooms at a velocity of 0.3 m/sec. Warm air from the kitchen, the bath, and the toilet is sucked away, on the way out passing the heat exchanger.

An electrically driven heat pump heats the preheated incoming air up. Because the entire air of the house is exchanged, there is no need to ventilate the rooms by opening the windows. During summer, the ventilation can be used as air conditioning using the low ground temperatures

Total energy demand: 12,8 kWh/m²
Heating of space and ventilation air: 750 kWh/a
(energy source)
Domestic hot water: 350 kWh/a
(energy source)
Fans and pumps: 320 kWh/a
Lighting and appliances: 220 kWh/a

Transmission values of components

Windows and glazed doors	0,79 W (m ² K)
Exterior doors	1,20 W (m ² K)
Exterior walls	0,11 W (m ² K)
Ceiling of basement	0,11 W (m ² K)
Roof	0,11 W (m ² K)

Energy demand for heating: 15 kWh/m²a

Team:

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