

Location: D-37124 Rosdorf
Architecture Prof. Dr. Gernot Minke und
& earth building: Tobias Weyhe, Quedlinburg
Completed: 2001

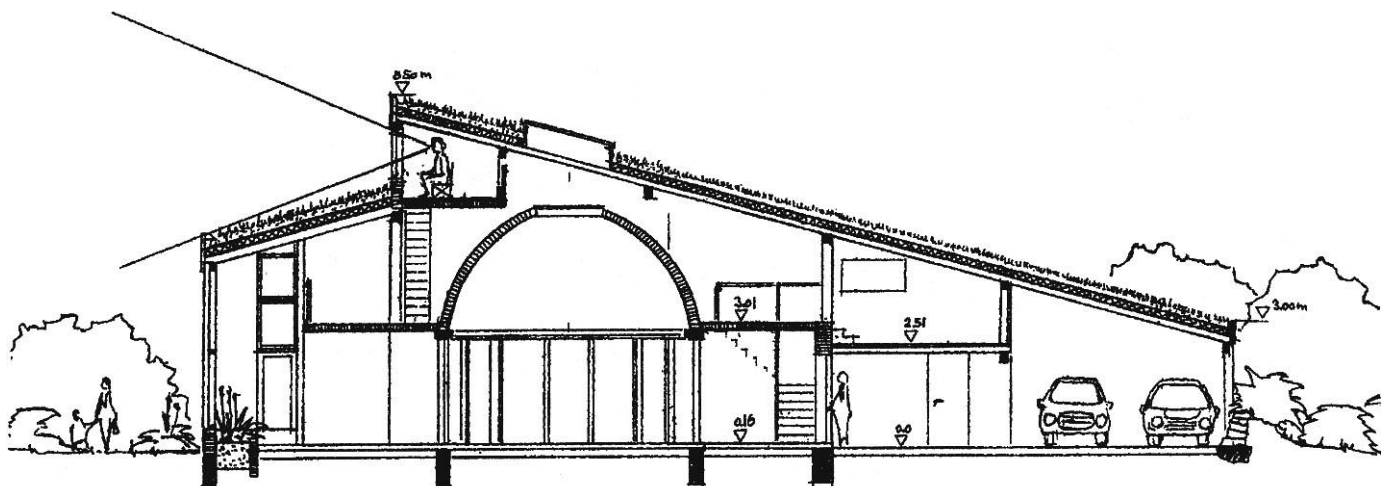


Private house with earth dome



In 2001 in Rosdorf near Göttingen a private house was built which unlike much of its red tiled roof surroundings attracts the attention of passers-by with its long shed roof and bank of solar cells. A further surprise awaits inside: a central living space with a two-storey earth dome. The house is grouped around this central 29 m² two-storey space whose earth dome spans a width of 6 m². The outer surface of the dome can be seen from the upper floor.

Light from a rooflight is allowed to fall either side of the dome, into the central space and the upper walkway which leads around the dome to the bedrooms and bathrooms. A ladder provides access to a lookout platform which affords a view of the surrounding landscape. The two-storey conservatory with green roof acts as a passive solar energy collector. A galerie in the upper floor looks down into the conservatory.



Section through the earth dome

earthen building · case study

Living area:	273 m ²
Building costs:	287 000 €
Netto cost/m ² :	1050 €/m ²
Heat demand:	49 kWh/m ² a

The 36.5 cm thick external walls are made of insulating perforated brickwork (λ -Wert 0.11), with an earthen plaster interior finish. The internal walls are made with earth bricks and mostly left visible for maximum beneficial effect on the moisture content of the indoor room air.

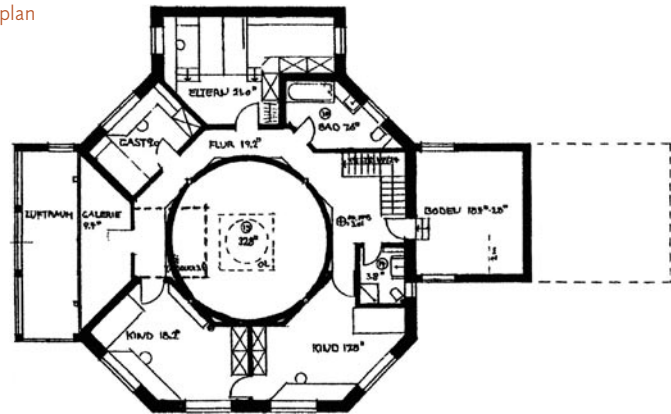
The floors are made of laminated wood panels, the shed roof with timber joists. The purlins, rafters and sheathing are visible from below and oiled with a colourless coating. The roof construction consists of a vapour barrier, 30 cm of insulation, a PVC-free root-protection lining, 15 cm of lightweight substrate and wild grasses and herbs.

A large roof with a 55 m² solar photovoltaic cell plant providing up to 6000 Watts of energy spans the carport and storage shed. A further 16 m² of solar collector roof covers a separate machinery shed. A wood-burning stove heats the central living space and can be supported by the active solar gain measures.

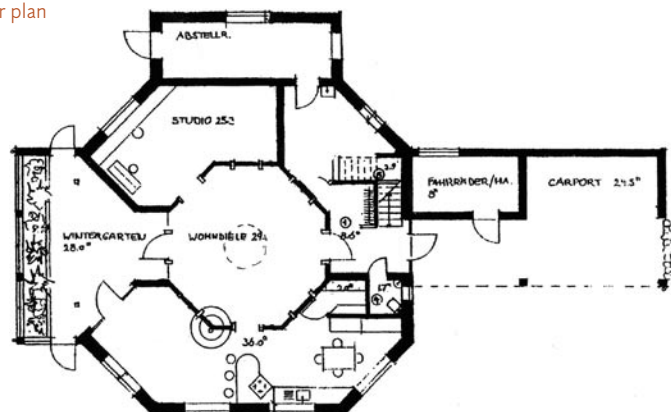
The building was planned as a low-energy house. The heat demand for the 327 m² floor area was calculated as 16,000 kWh. In 2002 the solar plant provided 26 % of the energy, the wood-fired stove the remaining 74 %.

The external walls have a U-value of 0.28 W/m²K. The U-value of the floor is 0.17 W/m²K, of the roof (without green roof) 0.18 W/m²K. The green roof has an additional considerable insulating effect, though this is not part of the calculations. Together with the 15 cm lightweight substrate and the thick layer of grass, a U-value of between 0.10 and 0.14 W/m²K is estimated.

Upper floor plan



Ground floor plan



The passive solar energy gain from the conservatory with its stone floor and facing earth brickwork offers a good thermal retention capacity which in turn has a further beneficial effect on the overall energy demand. The photovoltaic plant provides an excess of approx. 4,000 kWh per year.

