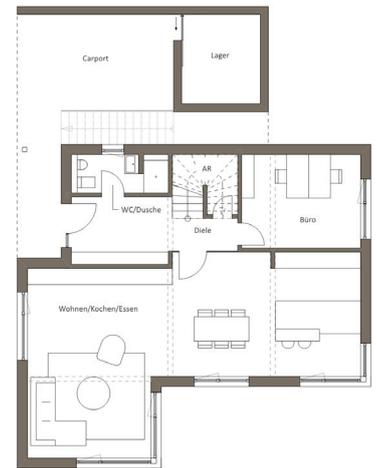




Single family house with fuel cell heating in Altusried, Allgäu



Name of project:	Single family house in Altusried	Building owner:	Lisa Sigmund and Dipl. Ing. (FH) Kurt Zügner, 87452 Altusried
Typology:	Residencen	Architect:	Die HausManufaktur GmbH 89231 Neu-Ulm www.diehausmanufaktur.com
Location:	Tannenweg 19 87452 Altusried, Germany	Facilities planner:	ZGT Zügner Gebäude Technik Dipl. Ing. (FH) Kurt Zügner 87452 Altusried
Completion:	2013	Copyright:	Photos and drawings: Phil MEINWELT Photography
Area:	280 m ² living space		
Technology:	Natural gas fuel cell heating combined with a gas condensing boiler for a low-energy home (KfW-70 standard) Fuel cell: • Thermal output: 1.50 kW • Electric output: 0.90 kW Gas condensing boiler: • Thermal output: 18 kW Buffer accumulator with fresh water module: 800 litres Fuel cell heating: Vaillant/SOFC fuel cell, VNFC 28+1 SOFC FT-Stand G5 +		

The good feeling of doing the right thing.

With the model home of HausManufaktur GmbH, a bit of Bauhaus architecture has been brought to Altusried in Allgäu. The **innovative low-energy house with integrated fuel cell technology** demonstrates how modern architecture and resource-saving construction can be combined in a usable area of 280 square metres. **The fuel cell installed by Vaillant is tested for everyday compatibility and use within the practical test.**

With the model home of HausManufaktur GmbH, a bit of Bauhaus architecture has been brought to Altusried in Allgäu. Situated on a hillside, the innovative cube with 280 square metres of usable area provides sufficient room for living and working under the same roof. The low-energy house with integrated fuel cell technology demonstrates how a modern architectural language and resource-saving construction can be combined.

The model home consisting of multiple cubes is located at the edge of a residential area with the gabled roofs typical for the region. When viewed from the entrance side, a single-story structure, which serves as the carport, projecting roof, or living space, shields the main building. The light stucco building utilises its hillside situation for the garden side and offers sufficient space for an office unit with separate entrance in the 100 square metre souterrain. The upper levels serve as living space. The ground floor has an open floor plan for the kitchen and living area, a guest WC and an additional room.

The bedrooms with dressing room and bath are located on the upper floor.

Custom living

The building floor plan is extremely variable and enables the individual levels to be divided into separate usage units with only a few changes. 'Our desire is to provide people with their dream home and design the exact house to meet their expectations of comfortable living. And, of course the architecture and design should be appealing,' explained Lisa Sigmund of HausManufaktur GmbH. Bright rooms dominate the interior. Large glass façades, mostly spanning from floor to ceiling, and a room height of 2.70 metres provide ample light and a friendly ambience.

The souterrain was constructed from prefabricated concrete elements. The two upper levels built on top of this supporting structure have a wooden frame structure. As a result, the new construction achieves the energy level of a low-energy house and corresponds to the KfW-55 standard.

High-tech building technology in a single family house

The model home of HausManufaktur demonstrates innovation in architecture and the energy standard, as well as the building technology. **The first hydrogen fuel cell heating system in a single-family house in Allgäu has been commissioned by Vaillant for practical testing.** The company has installed systems in private homes in various series of tests in order to test their everyday compatibility and handling, and to ultimately make them market-ready. Supported by an initiative of the European Commission, the EU-funded project 'ene.field' started in 2012. Nine manufacturers are testing their fuel cell technologies based on approx. 1,000 systems in twelve EU Member States. In 2014, Vaillant has around 140 state-of-the-art units in operation. **'The fuel cell heating system is an important step on the way to decentralised power supply and a contribution to the energy transition,' explained Dr. Marc Andree Groos, Managing Director of Vaillant Germany. 'That is why the installation is supported both by the EU and by numerous power companies and Vaillant.'** Along with Vaillant, energy provider Erdgas Schwaben contributed 3,000 Euro for the financing. The energy provider also provides the natural gas from which the fuel cells generate hydrogen for the heat and power.

Energy efficiency thanks to fuel cells

The latest generation of fuel cell heating units is used in Altusried. Designed for use in single family and two-family homes, natural gas is split into carbon dioxide and hydrogen in the oxide ceramic fuel cell. The hydrogen that is released reacts with the oxygen in the air and generates thermal energy and direct current in the combined heat and power process. Based on the primary energy requirement, the fuel cell technology is up to 50 per cent more efficient than the best currently available condensing units, which means that CO₂ emissions are reduced by around 30 per cent. Moreover, there are no conversion or line losses arising in the power generation. With an overall efficiency of over 90 per cent, the fuel cell heating generates approximately one kilowatt of current and two kilowatts of heat. Heating with gas cannot currently take place more efficiently.

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