

Efficiency House Plus: A Plus-Energy Building in Berlin

Building Name and ID

Building Name:	Efficiency House Plus
Building ID:	-
Real:	Real
Published:	-
Date entered:	28.08.2017

Picture



Photos: ZEBAU – Zentrum für Energi, Bauen und Architektur und Umwelt GmbH

General Information

Building Name:	Efficiency House Plus
Climate Zone:	Temperate
Project State:	New Build
Building Sector:	Residential
Building Type:	Single Family
Mode:	Closed
Energy Efficiency Level:	PEB

Year Built:	2011
Location:	Fasanenstraße 87a
Municipality:	Berlin
State:	Berlin
Country:	Germany
Geo. Latitude:	52,51 °N
Geo. Longitude:	13,33 °E

TFA:	149 m ²
Treated Building Volume:	634 m ²
Number of Dwellings:	1
Cost/m ² :	16778 €/m ²

Summary

Description

The former Federal Minister for Transport, Building and Urban Development noted that it should be possible to build and run new buildings from 2019 onwards as climate neutral. Thus, they undertook the experiment to build, demonstrate and test such a building with a model function to showcase the exemplary nature of living and electro-mobility under real conditions. One aim was to show that such a building could be built without a loss in comfort or quality, but rather that energy efficient and sustainable buildings were possible with a sophisticated lifestyle. By studying the interactions and synergies of buildings, energy generation and electro-mobility in respect to sustainability, suitability and market suitability, it was planned to gather recommendations concerning energy management with electro-mobility.

An architectural competition in 2010 called for proposals “to demonstrate the status of development in the networking between energy-efficient-buildings, sustainable building and living [...] by means of a real-life, architecturally attractive research pilot projects”. The Architecture and University competition was won by the University of Stuttgart in collaboration with Werner Sobek Offices. It took only 4 months from competition completion till completion of the building.

Completed in 2011 the house is centrally located, at Fasanenstraße 87a, 10623 Berlin, near the Technical University of Berlin and close to Kurfürstendamm and was officially opened by Chancellor Angela Merkel on 7 December 2011, following a year of previous planning and construction. It was the first real building combining the two concepts of “energy efficient building” and “electro-mobility”.

The building was inhabited by two families, from March 2012 to February 2013 and 2014, to test the building under real conditions. Both families were made up of two adults and two children. The first family was very happy to live in the building and were pleasantly surprised by the thermal comfort of the building.

The scientific monitoring was carried out by the Fraunhofer-Institut for Building Physics IBP and provided scientific support for the project. In addition, a social-scientific monitoring was carried out. For the technical monitoring, Fraunhofer IBP measured in detail the monthly balances of the final energy use, the energy sources and energy consumers as well as the electricity production by the photovoltaic system, and compiled the measurements to cumulated energy gains and uses.

Lessons learnt

The building is a prototype and has its fair share of problems. The aim to completely supply the building and electro-mobility with energy was not met in the first test phase. The provided energy supply for the car was only a quarter of that needed. Two thirds of the energy used by the building had to be bought from the public net. From the PV yield half was supplied into the net and the other half was consumed by

the building and electro-mobility. The energy consumption of half of the PV was expected from calculations. One reason for this is that the solar yield was 40% lower than the long-term average and another reason is that the house was shaded by surrounding buildings due to its public location.

Project Description

General Information

Year of construction:	2011
Year of refurbishment:	-
Status:	Closed
Treated Floor Area:	149 m ²
(Gross floor area):	181 m ²
(Gross volume):	645 m ³
Number of floors:	2
Areas:	-
Number of units:	1
Number of occupants:	4
Elevation:	34
Orientation:	E-W
Average Summer Temperature	18,6 °C
Average Summer Humidity	64 %
Average Winter Temperature	0° C

Architectural Description:

The single-family house has a living area of approximately 130 m² with two storeys and was designed for a family of four. Key design features were:

- An extremely compact design;
- Maximization of energy gains through the building shell;
- Optimization of the structural technology without any loss of comfort to its inhabitants;
- Assurance of energy need through renewable generated energy

The entrance to the building is via the Fasaenstrasse via the "shop-window". The "shop-window" in front of the building is meant for parking the vehicles and contains the charging infrastructure for the electric vehicles, an electric car and two pedelecs. The so-called "energy core" of the building is placed between the shop-window and the living area. The energy core includes the building service technologies, but also the wet rooms (bathrooms, kitchen, etc.).

The living spaces of the building are oriented to the East and cover two floors. The ground space is dedicated to the communal rooms of kitchen and living room and the second floor to the bedrooms and bathrooms. Except for the WC and the utility areas, the ground floor is an open plan concept. The upper floor can be converted to an open plan concept as well.

The floor plan of the building was developed to be flexible so that after the initial testing phase it could be converted to a conference / event location to promote

energy efficiency in buildings. The conversion can take place without any major structural alterations. Due to the modular design the building could in theory also be adapted for other needs.

(Stakeholders)

Owner:	BMBVS
Investor:	BMBVS
Developer:	BMBVS

Certificates and Compliance

MEPS (Minimum Energy Performance Standard)

Description or list of Minimum Energy Performance Standard which building must comply to:

Needs to comply with green buildings laws:	No
Needs to comply with energy efficient buildings laws:	Yes

Special Features

A distinctive feature of the house is that all elements can be separated and moved to another location or be disposed of after the lifetime of this particular project contributing to resource efficiency in the project. Originally it was planned that the building could be completely recycled after the two years of testing. The building was built along the lines of material efficiency, ecology and recyclability. In order to achieve this, an integrated design and building process were implemented from the start. Wherever possible ecologically compatible materials were employed to allow for a complete recycling of the building. All materials used conform as far as possible to the Environmental Product Declaration (EPD). The materials and fittings used were chosen to reflect a modern style, yet at the same time show that these are ecologically viable. In addition, water-saving fittings were used to reduce water consumption.